ON DOCKET.

REMOVAL SITE INSPECTION
KELLY MINE
RED MOUNTAIN, CALIFORNIA

Prepared for:
California State Office
U.S. Department of Interior
Bureau of Land Management

National Science & Technology Center
Bureau of Land Management

EXECUTIVE SUMMARY

Under the provisions of 40 CRF 300.415 of the National Contingency Plan, BLM has preformed a Removal Site Inspection at the Kelly Mine near Red Mountain, California. One of the largest silver mines in California, the Kelly Mine and its predecessor operated from 1919 to the 1940s, producing over $10 million in 1924 revenue dollars. The site was first identified as a hazardous materials site by BLM in December 2005. The goals of the RSI were to identify safety hazards such as open shafts, characterize whether there was a release of hazardous substances, characterize the nature and extent of contamination in mine tailings and waste rock dumps, and to determine whether and what time-critical and non-time critical removal actions are necessary.

Seven areas consisting of over 67 acres were evaluated including the Kelly Mine complex, numerous shafts, tailings and nearby rock dumps and the Barker Mill tailings. In February 2006, BLM collected approximately 250 samples of soil and mine waste at the site and analyzed them for a suite of metals using an x-ray fluorescence spectrometer (XRF). A suitable fraction of the samples were split and shipped to laboratories for additional chemical analyses and for confirmation of the XRF analyses. Samples were also taken at depth in the waste rock dumps and tailings to help determine the vertical extent and characteristics of the waste. Although there are over 100 nearby residences in the adjacent town of Red Mountain, BLM did not sample private properties in this investigation because of lack of authority on private land.

The major chemical of concern causing human health risk is arsenic, with minor risk provided by antimony and possibly tungsten for the Barker Mine. Arsenic averages 1,490 mg/kg in the Kelly Mine tailings, 993 mg/kg in surface soil in the Kelly Mine and 2,035 mg/kg in the Kelly Mine waste rock dumps, 1,960 mg/kg in the Red Mountain Wash tailings, and much lower in the Barker Mine tailings. This investigation determined background arsenic for the area to be 136 mg/kg. Additional characterization of background will need to be conducted in future investigations to verify this background level. Arsenic is a human carcinogen and the concentrations present pose high to very high risk for recreational visitors and potentially for nearby residents where tailings have migrated into residential area.

Analytical and visual evidence shows a release of over 46,000 cubic yards of arsenic tailings has migrated through the Kelly Tailings Dam breach across residences in the town of Red Mountain and have migrated into Red Mountain Wash. It is likely much of this release dates back to mining days. Principal receptors at the site include 100-200 residents of Red Mountain, and an unknown number of recreational visitors, especially off road vehicle users. Soil ingestion is typically the most important exposure pathway for both recreational visitors and residents. In addition, inhalation of dust and ingestion of settled indoor dust may be an exposure pathway especially due to off road vehicle activity during weekends and holidays. Drinking water is supplied from Randsburg Community Water District from wells in Fremont Valley. There is no surface water at the site.

The site contains habitat for the endangered desert tortoise and Mojave ground squirrel.

The RSI recommends several time critical actions be taken as soon as possible: fence the tailings, shafts and glory hole at the site to prevent access and arsenic exposure, repair the tailing dam breach and install run-on and run-off controls to prevent further migration. It is also recommended that EPA sample private residences and that further studies be performed to study alternatives and select non-time critical action(s) that would lead to a permanent remedy at the site.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

ABA	Acid Base Accounting
ARARs	Applicable, Relevant and Appropriate Requirements
AST	Above Ground Storage Tank
ASTM	American Society for Testing Materials
BLM	Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHSO	Corporate Health and Safety Officer
COC	Chemicals of Concern
CN	Cyanide
CLP	Contract Lab Program
DOT	Department of Transportation
DQO	Data Quality Objective
EPA	U.S. Environmental Protection Agency
EE/CA	Engineering Evaluation/Cost Analysis
gpm	Gallons per minute
HDPE	High Density Polyethylene
HSP	Health and Safety Plan
ICP	Inductively Coupled Plasma
IDW	Investigation Derived Waste
LCS	Laboratory Control Sample
msl	Mean Sea Level
NCP	National Contingency Plan
NIST	National Institute of Standards and Technology
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
PRG	Preliminary Remedial Goals
RSI	Removal Site Inspection
RMC	Risk Management Criteria
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RCWD	Rand Community Water District
RCRA	Resource Conservation and Recovery Act
RSI	Removal Site Inspection
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
STLC	Soluble Threshold Limit Concentrations
TPH	Total Petroleum Hydrocarbons
TTLC	Total Threshold Limit Concentrations
USFWS	U.S. Fish and Wildlife Service
WET	California Waste Extraction Test
XRF	X-ray Fluorescence Spectroscopy

1.0 INTRODUCTION

The U.S. Department of Interior, Bureau of Land Management (BLM) prepared this Removal Site Inspection (RSI) for the Kelly Mine and associated mine waste sources near Red Mountain California. This RSI has been prepared in accordance with the criteria established under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), sections of the National Contingency Plan (NCP) applicable to removal actions (40 CFR § 300.415 (b) (4) (1)).

The purpose of this RSI was to identify the activities that was conducted to: (1) map the mining and site features, (2) characterize the nature of any hazardous process chemicals that remain at the site; (3) characterize the nature and lateral extent of contamination in mine tailings and waste rock dumps, and (4) collect data to determine whether and what time-critical and non-time critical removal actions are necessary. Because of the size and complexity of the site and because of the extent of offsite migration, BLM recognizes that additional work will be necessary to support long term remedies for the site.

The RSI included six principal waste source areas in the investigation. All are on BLM land administered by the BLM Ridgecrest Field Office. Area 4 contains tailings that have been released from Kelly Mine across a residential area and into Red Mountain Wash. An Area 7 was later defined as several off-site rock dumps near Red Mountain. BLM did not sample on private land. Area 1 is the tailings just west of the town of Red Mountain and Area 2 is the mill area. Area 3 is a ridgeline southwest of Area 2. Area 4 consists of tailings in Red Mountain Wash that migrated from Kelly Mine Area 1. Area 5 is the lower Barker Mill tailings, and Area 6 is the upper Barker Mill tailings. Area 7 is not contiguous, but was added during the field work to include scattered waste rock dumps in the town of Red Mountain and north of Red Mountain Road located on BLM administered land.

The following sections describe the site characterization and sampling activities and results, and include a streamlined risk assessment and recommendations.

2.0 SITE HISTORY AND SITE DESCRIPTION

2.1 Site Location and History

The Kelly Mine site is located near the community of Red Mountain in San Bernadino County, CA at approximately 35° 21' 30"N, 117° 37' 00"W (WGS84/NAD83) on the USGS Red Mountain Quadrangle, (Figure 1). It was formerly called the California Rand Silver Mine and was the most significant silver mine in California in the early to mid 20th century. The site is approximately five miles north of Atolia on U.S. Highway 395. For the purposes of the preliminary investigation, the site was defined to include the area shown in Figure 1, including parts of Sections 6, and 7, T29S, R41E, and Section 1, T29S, R40E.

According to BLM records, initial mining operations were begun at the Kelly Mine in 1919. By 1921, the complex included an assay office, a storehouse, a compressor room, a change room, a hoist house, and approximately 12 cottages for the miners. Construction of the mill was begun in 1921 in order to process the ore on site. Occasional use of the complex continued from 1926-1929; the corporation was then dissolved in 1930 and mining was carried out by various lessors in the 1930s. Mining was conducted on a sporadic basis in the 1930-1940s however, recovery levels never reached the levels in the original "find". In the 1960s, a number of speculative ventures were carried within the complex, with machinery and equipment brought in from other mines to insure investors that the mine was economically viable. The present mine configuration contains 56 features and two isolates.

Red Mountain was a booming mining district in the early 1920's. Currently, there are about 400 residents between three mining towns, including about 150 in Red Mountain. The original name of Red Mountain was Osdick, named after one of the original miners. The town was an active and social center for the mining district in the 1930's. Red Mountain is part of the Randsburg Mining District which includes Randsburg and Johannesburg.

2.2 Structures/Topography

A 360 degree video clip of the site is found at: http://virtualguidebooks.com/SouthCalif/SouthernDeserts/RandMiningDistrict/AboveRedMountain.html. The average elevation of the site is 3,600 feet above mean sea level. BLM is performing aerial mapping of the site to better characterize site features and extent of contamination.

The site is located between the Rand Mountains to the west and Red Mountain to the east. Red Mountain consists of Tertiary sediments of continental origin which are capped by later flows of andesitic lavas. The major structures associated with this Red Mountain Mining District are shown in Figures 2 and 3 and include numerous shafts, headframes, tanks, access roads, mill and auxiliary buildings, numerous waste rock dumps, and tailings ponds. Major shafts are the Highway 395 shaft, and the Kelly shaft, but there are at least five additional shafts in Area 2. Area 2 also contains the mill building, the hoist building and several other structures. Area 2 has several large waste rock dumps. Tailings in Areas 1 and 4 are from the Kelly Mine. Tailings in Areas 5 and 6 are from the Barker Mill which is reported to have been a tungsten mill. Area 6 also contains an old mill foundation and five mostly empty tanks.

There is no permanent surface water at the site, but there are many ephemeral drainages. As many as 100 residences are shown on the Red Mountain Mining District USGS 7.5' Quadrangle and the 2002 aerial photograph. Most of the residences are on private property, but up to seven are located on BLM-administered land. Water is supplied to the community of Red Mountain by the town of Randsburg. No individual wells are believed to exist in Red Mountain, but a house-to-house survey may be needed to ascertain this.

2.3 Geology, Ore Deposits and Hydrology

The Rand Mountains are composed of flat-lying schists which have been intruded by a younger plutonic rocks of quartz monzonite and by later series of shallow dikes of diabase and rhyolite-latite. The poorly consolidated Rosamond series are sedimentary rocks of continental in origin and consisting of stratified conglomerates, feldspathic sandstones and clays, either outcrops or underlies deposits near Red Mountain. This rock unit either outcrops or underlies economic mineral deposits near Red Mountain. Lakebed sediments, in part derived from the Rosamond series sediments, underlie the area covered by the Red Mountain volcanics. The structural geology near Red Mountain is complex. For example, near Johannesburg, strata dip northeast at ten to 20 degrees, but one mile south near Red Mountain, they lie flat. There is a closed synclinal basin two miles southeast of Johannesburg near the location of the Big Four shaft which had penetrated 1,100 feet in 1925. The shaft penetrates beds of the Rosamond series and at 1,100 feet, strata dipped west at 55 degrees. Silver mineralization occurred during deposition of the Rosamond series. Overlying the Rosamond series is a thick sequence of extrusive volcanic rocks that consist of andesite lava flows that are interbedded with agglomerates and tuffs (Hulin, 1925). These volcanic rocks are in angular unconformity with the underlying Rosamond series.

According to Hulin (1925), the California Rand Silver Mine (Kelly Mine) opened in 1919 exploiting an outcrop of cerargyrite. In 1925, it was owned by California Rand Silver Company of Bakersfield. Work focused on the Shaft Vein that was 17 feet by 22 feet by 75 feet deep. Subsequently, 40-50 shafts were sunk within a one mile radius to exploit this deposit. A 100 ton flotation nill was constructed in 1921; later improvements increased capacity to 400 tons per day. The mine had seven miles of drifts and crosscuts. Principal shafts were the No. 1, No. 2 and the No. 6. The No. 1 shaft is 2-compartmented and inclined at 73 degrees following the dip of the Shaft vein. In 1925, it extended through vein material and schist 11 levels down to 660 feet below ground and was dry at the bottom. The No. 2 shaft is also 2-compartmented and in schist, but is vertical extending to 14 levels and 1003 feet in 1925. The No. 1 and No. 2 shafts are shown on Figure 2. Water was struck at 715 feet below ground. The No. 6 shaft on the northern part of the property was single compartmented and extends 785 feet with a "little" amount of water. Hulin's mine maps show this shaft potentially in the area of the Claire Mine rock dumps. The No. 6 entered schist at 560 feet below the collar with the material above being Rosamond sandstones. In the five years through March 30, 1924, over 10 million ounces of silver and 30,000 ounces of gold were produced, worth over $10 million in 1924 dollars. Mining gradually slowed, then stopped during the 1940s.

There is no permanent surface water at the site only ephemeral and intermittent drainages. The site is located in a small drainage area of about 200 acres above the site. Drainage is to the east and southeast into the normally dry Red Mountain Wash. Red Mountain Wash flows south or southeast eventually into Cuddeback Dry Lake, approximately ten miles distant. While tailings are now known have been transported long distances down these drainages, the Phase 1 investigation has focused on the BLM administered section within 1 mile of Red Mountain.

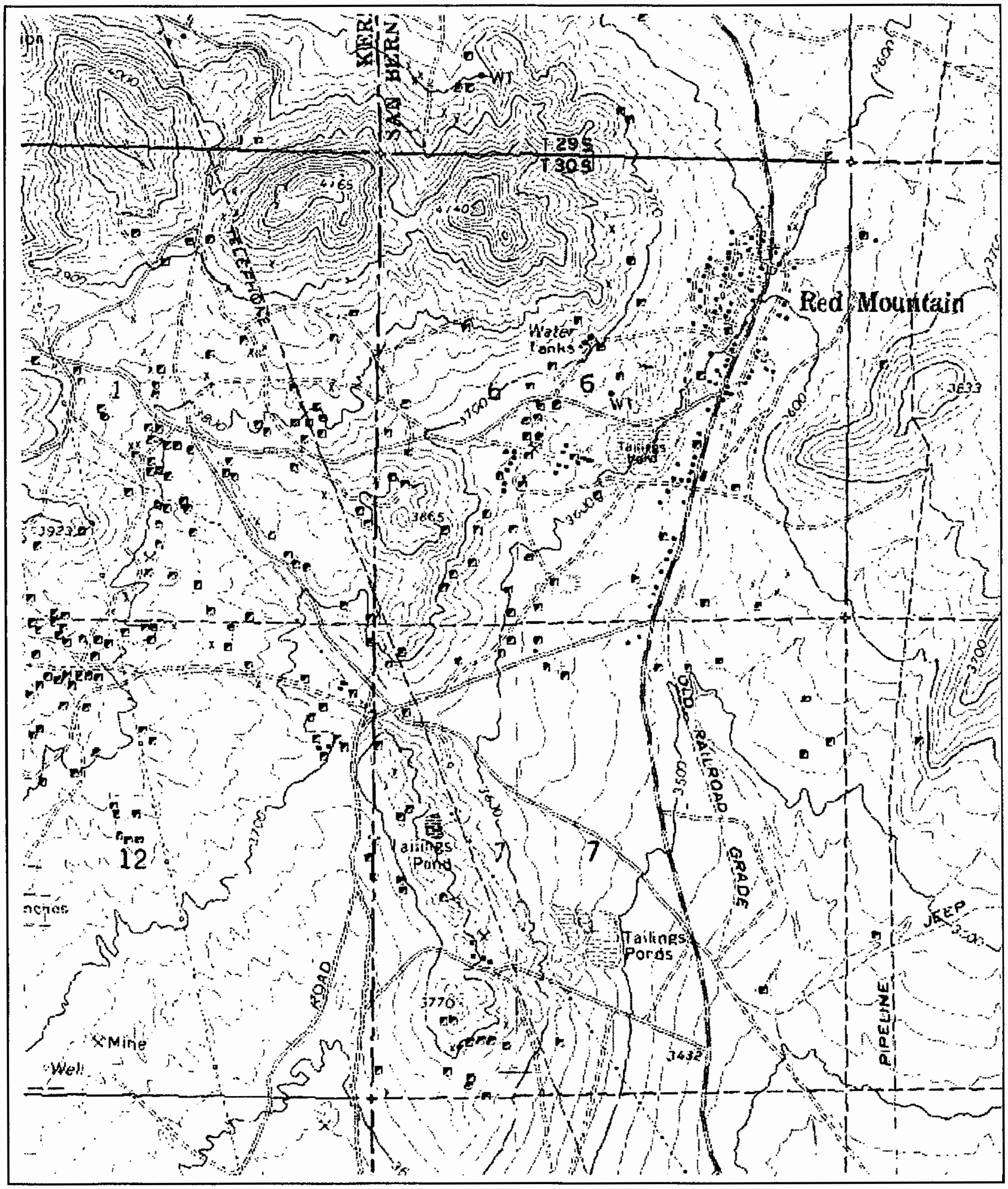


Figure 1. Red Mountain Site Location Map

2.4 Surrounding Land Use, Populations and Water Supply

Areas 1 and 2 are bounded by Kelly Road on the south and Red Mountain Road on the north, the town of Red Mountain on the east and a detached residential area on the west. Areas 3, 4, 5 and 6 are bounded by BLM administered land or private patented land. The small community of Red Mountain with approximately 100-200 persons is located adjacent to the site on the east and west. At least 10 town lots abut the site on the east side of Area 1 and seven residences abut the site on the west. A major highway, U.S Highway 395 bisects the site. The Rand Mine, a modern open pit cyanide leach operation, is located about one mile west of the Kelly Mine on the other side of a topographic divide. The Rand Mine is in the final stages of mine closure and decommissioning of the heap leach pads.

The Rand Community Water District (RCWD) provides water to Red Mountain for drinking water purposes. RCWD never used any water in the Red Mountain/Randsburg area. According to Chris Kelly, Manager of the Rand Community Water District, they had "nothing to do with the water since they took over the wells in the late 1960's early 1970's" (Kelly, 2006). He stated that their previous water company also did not use the water in the Red Mountain Area. According to Mr. Kelly, everyone in the communities of Red Mountain, Randsburg and Johannesburg, are on the Rand Community Water District's system and no one uses a private well. The only known private well is the abandoned Airport Well located about 1 mile northeast of Red Mountain. This well was last tested in late 1980's and the arsenic concentration was 0.11 ppm (according to Jay Friel occupant on the site). Arsenic has been detected above EPA maximum contaminant levels in one RCWD well #2 at 9.2 mg/L in 2002 (Kelly, 2006).

The valley west of Red Mountain contains poor quality groundwater at depths of several hundred feet in gravels and that mining and milling groundwater was supplied from an area north of Red Mountain in Red Mountain andesite. Groundwater in Red Mountain area was reportedly greater than 700 feet (Hulin, 1925). Groundwater depth at the Rand Mine fluctuates at around 350 feet below ground surface, according to reports from Hargis Associates in 1997-1998 (Hargis Associates, 1998).

2.5 Sensitive Ecosystems

The site is situated in the Mojave desert and there are no streams in the area. According local reports, the desert tortoise (*Gopherus agassizii*), a Federally- and State-listed threatened species and Mojave ground squirrel occur in this area. The U.S. Fish and Wildlife Service visited the site during the February field work to search for tortoise sign, but none was found. However, the tortoise is in hibernation during this time of year.

2.6 Meteorology

The climate in the area is typified by low annual precipitation, hot summers, and cool winters. Climatological data for Randsburg shows the yearly average maximum temperature to range to 98.3° Fahrenheit in July, and yearly minimum temperatures at 35.7°F in January. Average annual precipitation is listed as 6.26 inches per year with 3.3 inches of snow, (http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?carand+sca). While winds blew from the northeast during the field work, the prevailing wind direction is known to be 220 degrees.

2.7 Site Waste Characteristics

Previous reconnaissance tailings sampling at the site was conducted by BLM in December, 2005. These results showed high arsenic concentrations ranging to 4700 mg/kg. Although only limited previous site characterization work has been conducted prior to the RSI, it was expected that the tailings dumps contains high concentrations of metals (arsenic, and lesser concentrations of antimony, copper, and zinc), waste rock piles may also have similar contaminants.

2.8 Previous Investigations

In December 2005 site reconnaissance, BLM personnel collected seven waste rock and tailings samples for metals analysis. Arsenic averaged 2780 ppm (Chemex, 2006).

2.9 Cultural Investigations

In 1996 a cultural study was performed for the Kelly Mine and is considered eligible for the National Resister of Historic Places under criteria A, C, and D.

3.0 SITE CHARACTERIZATION

The RSI field investigation was conducted to obtain the data necessary to: complete a removal site inspection and characterize any waste chemicals for removal, if required; determine the impact, if any, to surface water from mining activities; and characterize the nature of the wastes to evaluate human and ecological risk.

Field work conducted to obtain this data was conducted in February 13-19, 2006, and included collection and analyses of tailings and waste rock samples from the site, and mapping of site features. These sampling activities were conducted per the Sampling and Analysis Plan (BLM, 2006) and are described in detail in the following sections. The sample locations are provided in Figures 4, 5 and 6 (Attachment 1).

All environmental and waste source samples were collected in accordance with the criteria specified in the following documents: *Compendium of ERT Soil Sampling Procedures (EPA/540/P-91/006)*; *Compendium of ERT Surface Water and Sediment Sampling Procedures (EPA/540/P-91/005)*; *Compendium of ERT Waste Sampling Procedures (EPA/540/P-91/008)*. In general, surface soil samples were collected using stainless steel trowels or disposable/single-use sampling equipment. Subsurface soil samples were collected using drilling equipment; specifically, a hydraulic push Geoprobe unit that was owned and operated by staff from Soilprobe Inc. of Tulare, CA.

3.1 Data Quality Objectives

The data quality objective (DQO) process is a series of planning steps based on the scientific method that is designed to ensure that the type, quantity, and quality of environmental data used in the decision making are appropriate for the intended purpose. DQOs specify the quality of the data necessary to support evaluation of risk in the human health and ecological risk assessments and the decision making process (EPA, 1987). DQOs in general reflect the uncertainty in the data that is acceptable for each specific activity during the investigation. This uncertainty includes both sampling error and analytical instrument error. The ideal level of uncertainty is zero; however, the variables associated with the sampling and analytical processes inherently contribute to some overall uncertainty in the data. The objective of quality assurance and quality control (QA/QC) is to assure that the uncertainty of the generated data is within an acceptable range that will allow proper evaluation of the Site through the collected data.

Different intended uses of data require different levels of analytical and sampling certainty. In order to achieve the objectives of the RSI, specific data quality requirements are specified, where appropriate, throughout the Quality Assurance Project Plan (QAPP). Section 3 of the QAPP provides the specific quality assurance objectives for the field and laboratory measurement data (BLM, 2004).

Appropriate quality levels have been specified for analytical data to be collected for this RSI. The following definitions of analytical levels were used for this project:

- Level I - This analytical level applies to field screening or analysis using portable instruments. Results often are not compound-specific; however, they can be quantitative or qualitative. The results are available in real time. This level is the least costly of the analytical options. Field measured pH, specific conductance (SC), and air borne particulates are examples of this analytical Level.

- Level II – This analytical level is characterized by the use of portable analytical instruments (e.g. portable x-ray fluorescence spectrometers) that can be used on-site or in mobile laboratories stationed near the Site (close-support laboratories). Depending upon the types of contaminants, sample matrix, and personnel skills, qualitative and quantitative data can be obtained.

- Level III - Under this analytical level, all analyses are performed in an off-site analytical laboratory using standard EPA methods (e.g., SW-846 Test Methods for Evaluating Solid Waste ,Third Edition, referred to hereinafter as SW-846, EPA methods for chemical analysis of water, and ASTM methods for geotechnical laboratories). One laboratory, ALS Chemex does not use EPA methods and samples were split with ACZ Laboratory using EPA Methods for interlaboratory comparative evaluation.

To meet the goals of the RSI and to obtain sufficient quality data to evaluate the Site and its present condition, soils, mine and mill tailing samples were collected. Each media was analyzed to obtain Level II or III data. Level I field screening of various media and physical data will also be used to help define the nature and extent of wastes and potential migration pathways. Data types, analytical levels, and data uses for the RSI are summarized in Table 1-1 of the QAPP. Analyses were used to determine concentrations of chemicals of potential concern (COPC).

Levels II and III reflect the need for high quality data that can be documented as being representative of Site conditions. These levels are necessary to evaluate the Site for the quantitative analysis in the risk assessment and to be able to evaluate Site conditions in terms of certain potential Applicable and Relevant or Appropriate Requirements (ARARs). For soils, the DQO was to attain 25 ppm arsenic detection limit for XRF and >0.9 R^2 with laboratory confirmation splits. The DQO process is further discussed in the Quality Assurance Project Plan (BLM, 2004). The specific analytical methods for chemical analyses that have been selected are as follows:

Process Wastes (if any):
- EPA SW-846 Method 1010 - Flash Point
- EPA SW-846 8015 - Total Petroleum Hydrocarbons (TPH)
- EPA SW-846 Method 9040B - pH

Mill Tailings and Waste Rock:
- EPA Method 335.1 - Total Cyanide – Soil or water
- EPA Method 200.7 - Total Metals, Dissolved Water
- EPA Method 245.1 – Mercury Dissolved Water
- EPA Method 6020 – Total Metals in soil
- ALS Chemex ICP/MS – Total Metals in soil
- EPA Method 6200 - Field Portable X-ray Fluorescence Spectrometry
- Acid Base Accounting, pH and Lime Requirement – EPA Sobek
- California WET Test with deionized water extraction
- Bioaccessibility per method of Ruby (1994).

The California WET test was performed to measure leaching. Since the tailings and waste rock >500 mg/kg arsenic is a California hazardous waste anyway, it was recommended by Greg Reller (2006) not to do the aggressive extractant specified in the WET and replace it with an extractant similar to precipitation to better represent site conditions.

Upon collection, samples were immediately placed in an appropriate container. The sample containers were then labeled and prepared for shipment to the appropriate analytical laboratory or stored for later XRF analysis. The information provided on the sample labels included: time and date the sample was collected; sampling location; preservative used; initials of person who collected the sample; and a unique sample number. Finally, all sampling activities and locations were recorded in the field notebook. Samples were shipped to ALS Chemex in Sparks, Nevada and ACZ Laboratories in Steamboat Springs, CO.

Because of the large area of the site, the site was categorized as waste rock dumps, or tailings, and depth samples were obtained as follows:

1. waste rock dumps – each major dump area was sampled using the test pit composites. The sample was collected from near vertical test pits at the toe of the waste rock dump. A vertical channel was sampled every six inches to make a 1 kg composite. This deviation from the Sampling and Analysis Plan was decided in the field because the large size of the waste rock dumps would not have generated enough samples. Approximately 61 representative samples from the dumps were collected and sieved to <2 mm.
2. soil and tailings – each tailing pond was gridded on 200 foot centers, depending on size of the pond. Samples were collected from 0-2 inches. Depth samples were collected every two feet from an east-west transect in Area 1 using a Geoprobe, and in Areas 4, 5 and 6. In addition to the discrete samples, one composite sample was prepared for each Area based on the method of Smith, 2000.

3.2 Opportunity Waste Sampling

No organic process waste was found. No surface water was observed. Twelve opportunity samples were collected from wastes associated with the mill buildings. 2-Sump-1 was collected from wet sumps in the mill building and 2-OP-3 consisted of tailings residue near a former vat adjacent and just east of the mill building where bluish streaks indicated the potential for cyanide. Opportunity samples were collected in Areas 2 and 6 as follows:

- 2-Sump-1
- 2-OP-1 white pile SW of mill
- 2-OP-2 S of mill pile
- 2-OP-3 E of mill at vat leach depression with bluish cyanide streaks
- 2-OP-4 pile N of mill
- 2-OP-5 coarse, acidic yellowish pile adjacent to N side of mill building
- 2-OP-6 from smelter or retort W of mill building
- 6-OP-1 tank bottom
- 6-OP-2 upper pile
- 6-OP-3 barrel
- 6-OP-4 lower small pond

3.3 Mine Waste and Soil Sampling

Samples were collected from the tailings and waste rock for metal analysis using a calibrated portable Niton 702 X-ray Fluorescence (XRF) bulk analyzer. The waste areas that are on BLM land are visible on the 2002 aerial photos. Area 3 was not systematically sampled because of its distance from town and inaccessibility. This area consists of a steep ridge (Lion's Head Ridge) with numerous shafts and waste rock dumps and has an indefinite boundary with private land. Table 1 describes the units, grid size and number of samples. Transects were established across each waste area on 200' centers using a laser rangefinder or measuring wheel.

The XRF sample preparation was performed according to EPA Method 6200 except a #10 sieve was used instead of a #60 sieve. Care was taken to ensure that all biotic matter (i.e., roots, plant material, etc.), was removed prior to analysis, that the sample is dry and that the sample is representative of actual waste. If the sample was moist, it was dried prior to sample preparation and analysis. For the 5 units, approximately eleven percent or 27 laboratory confirmation split samples, including two background samples for each of the 5 waste units, were collected and sent to ALS Chemex and/or ACZ Laboratory (Table 1). These steps were taken to ensure that the most accurate and precise results are generated by XRF analyses.

In addition, at least one composite sample for each waste unit was submitted to ACZ Laboratory for the following additional analyses:

- Deionized water WET analysis to estimate leaching concentrations, to determine leaching characteristics, and if waste was to be shipped offsite, if it is a California hazardous waste
- Total Metals (split with Chemex)
- pH
- Total cyanide
- Bioaccessibility via Dr. John Drexler, University of Colorado.

Composite tailings samples were sampled via the USGS method of Smith, 2004. This involved collecting 30 representative grab samples within the unit, compositing and sieving them through a 2 mm sieve to attain 1 kg. The same procedure was performed for the WET with a deionized leach (Reller, 2006) and pH tests using one composite from each site. Analyzing split samples in Table 1 via Chemex and ACZ added internal consistency and confirmation among methods.

Table 1: Sample Summary

Unit	Description	Approximate Area (acres)	Surface grid or depth	XRF Samples	Splits (Chemex)	Splits (ACZ)
1	Surface tailings near town	13	4x5	22	3	1
1	Tailings near town		Depth	15		
2	Surface mine complex W of Unit 1	25	5x6	30	3	1
2	Waste rock dumps		Depth	36		
3	Waste rock dumps		Depth	7		
4	Red Mtn. Wash tailings	12	13x3	39	3	1
4	Red Mtn. Wash tailings		Depth	8		
5	Tailings 2 mi. S of town	9	5x5	24	3	1
5	Tailings 2 mi. S of town		Depth	4		
6	Tailings W of Area 6	4	3x5	15	3	1
6	Tailings W of Area 6		Depth	6		
7	Waste rock dumps	3	Depth	12	1	
2,6	Opportunity		Surface	12	1	1
Bkgd	2 per area		Surface	10	10	
Total				249	27	6

[1]Surface samples unless otherwise indicated

Table 2: Laboratory Sampling Summary

Sample	Total Metals	Metals	CA-WET	pH	Bioaccess
Mine Waste	27*	6^	6^	6^	5

*Analyzed by Chemex; ^6 were split and analyzed by ACZ.

All laboratory samples were sent via Federal Express under proper chain of custody. 27 samples were sent to ALS Chemex in Sparks, Nevada and six samples were sent to ACZ Laboratory in Steamboat Springs, Colorado on February 18, 2006.

3.5 Supplemental Activities

In addition to the proposed sampling activities, data was collected for the following:

- size and volume of each waste area
- reconnaissance inspection of any mill buildings for lead paint, asbestos and transformers. None was observed. A transformer cage was observed near the mill, but all transformers had been removed. No soil staining was present.
- particulate air monitoring. On February 15, data was conducted continuously onsite using a MIE DataRam with detection limits to 0.001 mg/m3. The time-weighted average for the afternoon was 0.05 mg/m^3.

In addition, all grid perimeter sampling locations were recorded with a global positioning unit and sketch maps noted in the field notebook. A topographic survey of the site is underway. Site participants during the field work included representatives from the San Bernadino HazMat team, Kern County HazMat Team, Department of Toxic Substances Control, Bob Harik, Mine Exploration Inc., Greg Reller, TetraTech, Jim Rytuba, USGS, Soilprobe Inc, Blackhawk Enterprises, backhoe contractor, and BLM personnel.

3.6 Quality Assurance/Quality Control

Quality assurance and quality control samples were collected to ensure the integrity of the XRF sampling data. The QA/QC samples will consist of confirmation replicate samples collected at mine waste. Confirmation or replicate samples were collected to provide a check on the accuracy of the XRF analyses using linear regression per Method 6200. Blanks, certified standards and precision samples were analyzed to check for sampling and analytical reproducibility per Method 6200.

4.0 DISCUSSION OF RESULTS

Figures 4, 5 and 6 (Attachment 1) show the approximate discrete sample locations. The GPS locations will be accurately plotted on the aerial photograph when the site has been surveyed. Table 3 shows the XRF analytical results and Table 4 shows quality assurance sample results. Arsenic and antimony are the chemicals of potential concern. For arsenic, the range of the concentrations were less than the limit of detection (<LOD) to 8,134 mg/kg. Table 3 also shows California Total Threshold Limit Concentrations (TTLC) which are by definition California hazardous waste. Arsenic consistently exceeded the TTLC in Areas 1, 2 and 4.

The following sections summarize the XRF and laboratory results for the background samples and each area. Refer to Attachment 2 for photographs of the areas.

4.1 Background

Table 5 includes laboratory results for the ten background samples. The background samples averaged 136 mg/kg arsenic, 8 mg/kg for antimony and 9.3 mg/kg for tungsten. As shown in Table 3, these levels are considerably higher than for soils of the western United States (Shacklette and Boerngen, 1984), confirming the area is mineralogically enriched. Arsenic and antimony are elevated above local background at Areas 1, 2 and 4, and tungsten is elevated at Area 5 and 6 based on laboratory results.

4.2 Area 1

Area 1 consists of a tailings pond with a dam on the east side made of tailings. The dam has breached, transporting tailings to the east across private property near the 395 Shaft (see photographs). Reportedly during storm events, the tailings are then transported across Highway 395 to adjoining private property on the east side of the highway and thence downstream on Red Mountain Wash. The area of Area 1 tailings is approximately 13 acres. The tailings were 0 to 20 feet in depth based on the sampling, with an average depth of approximately 12 feet. Three Geoprobe borings were taken in Area 1 to represent an east-west cross section through the middle of the tailings pond. The locations were 1BB, 1-2B, and 1-3B. Tailings depth at these locations was: 3 feet, 15 feet, and 12 feet respectively; depth at the eastern face of the dam is about 20 feet. The samplers stopped collecting soil cores when lithology refusal was encountered, indicating contact with native soils.

Some samples at Area 1 perimeter did not capture the horizontal extent of contamination in all directions. Fence-line samples adjacent to the residential areas are 4A, 4B, 4C, 4D, and 4Z and range from 481 to 1350 mg/kg arsenic. Table 3 shows the arsenic results over the grid and at depth. The XRF composite arsenic result for this area is 1709 mg/kg, while the Chemex laboratory result is 1425 mg/kg. The mean arsenic concentration of the ten background samples is 136 mg/kg, and hence Area 1 samples exceeded background by 7-12 fold.

Using 136 mg/kg arsenic as a background concentration threshold and the XRF data and an average depth of ten feet, it is estimated that approximately 215,000 cubic yards +/- 20% are present. Further characterization will be needed to refine this estimate prior to implementing any final actions.

4.3 Area 2

Area 2 is the mine complex for Kelly Mine containing as many as six shafts, mill buildings and waste rock dumps. The area of Area 2 mine waste is approximately 23 acres. Area 2 contains shrubby vegetation and sparse grasses. Three types of samples were collected: surficial grid and opportunity samples, and waste rock samples. Table 3 shows the arsenic results over the grid and at depth. Using the surficial grid and opportunity discrete samples, the mean XRF arsenic concentration for this area is 926 mg/kg. About 40% of this area appears to be native soils that are contaminated at the surface; the rest is covered by rock dumps. The Chemex composite arsenic result for this area is 975 mg/kg. The mean arsenic concentration of the ten background samples is 136 mg/kg, hence Area 2 exceeded arsenic background by about 7 fold. Nearly all of the grid surficial samples at the perimeter captured the horizontal extent of contamination in all directions as defined by background. The residential area located on public land to the west of Area 2 fell below background arsenic concentrations except for 2-3A and 2-4A which had 211 and 290 mg/kg, respectively. The highest surficial concentrations were around the mill and adjacent areas to the north and east, with a maximum arsenic concentration of 5747 mg/kg from 2-OP-5 just north of the mill. The area around the mill has the highest arsenic concentrations found at the site. A volume of contamination from the surface grid samples was not computed because the mine waste is waste rock (see below).

The waste rock is typically flat-topped and varies in depth from 0 to 30 feet in depth, with an average of 25 feet based on the visual observations. The area of Area 2 waste rock dumps is approximately 15 acres. For above-ground waste rock, the samplers collected composites from a vertical profile in the test pit which ranged from 4-12 feet in depth. Using the test pit samples, the mean arsenic concentration for this waste rock in Area 2 is 2,038 mg/kg or about twice as great as the surficial grid samples, and background is exceeded by about 15-fold. Using 136 ppm arsenic as a threshold, the XRF data and an average depth of 25 feet, it is estimated that at least 595,000 cubic yards +/- 20% are present. Further characterization will be needed to refine this estimate prior to implementing any final actions. While the waste rock is less subject than tailings to wind and water erosion because of its coarse texture, there is evidence of leaching based on white efflorescent salts accumulating on the surface.

Area 2 was found to have six open shafts and the Glory Hole noted in Figure 2. The Glory Hole is approximately 120 feet in diameter and about 70 feet in depth. Numerous mine workings are visible in the bottom of the Glory Hole. It is unclear if the area has subsided, but surface features exhibit piping and tension cracks as well as evidence of caving. A perimeter fence is present, but it is badly damaged and in disrepair, creating a hazardous condition and an ineffective safety barrier to prevent public access.

4.4 Area 4

Area 4 tailings originated from Kelly Mine and migrated into Red Mountain Wash from the Area 1 tailings pond via a breach in the Area 1 dam. The area of the Area 4 tailings is approximately 6 acres, ranging from 100' to 400' feet in width and 2600' in length along Red Mountain Wash. The tailings are white to light tan, exhibit surface efflorescent salts and support little or no vegetation. BLM believes additional tailings exist downstream in Red Mountain Wash, but they were not a focus in this investigation. The tailings were 0 to 4 feet in depth based on the sampling and visual observation. In the lower third of Area 4, there are several test pits where it appears persons may have been conducting mineral exploration activities and testing the material. The samplers stopped collecting soil cores when lithology refusal was encountered, suggested native soils. Table 3 shows the arsenic results over the grid and at depth. Using the grid discrete samples, the mean XRF arsenic concentration for this area is 1,240 mg/kg. The Chemex composite arsenic result for this area is 1,870 mg/kg. The mean arsenic concentration of the ten background samples is 136 mg/kg, hence this area exceeds background by 9-10 fold. Nearly all of the grid surficial samples at the perimeter captured the horizontal extent of contamination in all directions. One small area north the grid was not sampled, because it was on private land. Using 136 ppm arsenic as a threshold and the XRF data and an average depth of four feet, it is estimated that at least 46,000 cubic yards +/- 20% are present. This is a minimum bound on the amount of tailings released from Kelly Mine. Further characterization will be needed to refine this estimate and additional characterization of the area down gradient of Area 4 will be needed prior to implementing any final actions.

Area 5

Area 5 consists of tailings from the Barker Mill (located in Area 6), a tungsten mill according to the mine claimant. Area 5 has an open shaft located near grid sample 5-2E. The area of the Area 5 tailings is approximately 9 acres. There are actually two impoundments, with samples 5-2B, 5-2C, and 5-2D being in the uppermost impoundment and samples 5-3B, 5-3C, 5-3D, 5-4B, 5-4C, and 5-4D in the lower impoundment. The tailings do support greasewood and other shrubby vegetation and some grasses. The tailings dam is approximately 40 feet in height and is made of tailings. The dam has been breached (see photographs) and some tailings appear to have migrated toward Highway 395. The tailings were 0 to 8 feet in depth based on the sampling, but are deeper to the east where Geoprobe could not access. However, the samplers stopped collecting soil cores when lithology refusal was encountered, suggested native soils. Samples at the perimeter are believed to capture the horizontal extent of contamination in all directions, but this is not ascertainable by arsenic concentrations which are low. Table 3 shows the arsenic results over the grid and at depth. Using the grid and opportunity discrete samples, the mean arsenic concentration for this area is 65 mg/kg. The mean XRF arsenic concentration of the ten background samples is 136 mg/kg. The composite arsenic result for this area is 96 mg/kg, hence this area does not exceed background. Tungsten concentrations from the laboratory sample composite was 350 mg/kg exceeding tungsten background for Areas 5 and 6 of 8 mg/kg. Using the XRF data and an average depth of ten feet, it is estimated that at approximately 144,000 cubic yards +/- 20% are present. Aerial surveying is needed to refine this estimate.

4.6 Area 6

Area 6 consists of mine workings (five tanks and an old foundation) and tailings from the Barker Mine, a tungsten mine according to the mine claimant. No shafts were observed. There is no dam structure in Area 6, although some small impoundments (dams <2 feet) are located in the northeast quadrant. The area of the Area 6 tailings is approximately 6 acres, including the mill and tank area at the top and west end. The tailings are white to light tan and support little vegetation. The tailings were 0 to 8 feet in depth based on the sampling. However, the samplers stopped collecting soil cores when lithology refusal was encountered, indicating contact with native soils. Samples at the perimeter appear to capture the horizontal extent of contamination in all directions. However this is not ascertainable by arsenic concentrations which are low. Table 3 shows the arsenic results over the grid and at depth. Using the grid and opportunity discrete samples, the mean arsenic concentration for this area is 148 mg/kg. The composite arsenic result for this area is 147.5 mg/kg only slightly exceeding local background of 136 mg/kg. Tungsten concentrations from the laboratory sample composite was 840 mg/kg and far exceed tungsten background for Areas 5 and 6 of about 2 mg/kg. Using 136 ppm arsenic as a threshold and the XRF data and an average depth of six feet, it is estimated that at least 30,000 +/- 20% cubic yards are present. Further sampling may be needed to refine this estimate.

4.7 Area 7

Area 7 is not contiguous, but is a loosely defined category consisting of isolated waste rock dumps in the town of Red Mountain (Claire Mine, 395 shaft), Uranium Claim west of Area 2 and the Big Dipper mine north of Red Mountain Road north of Areas 1 and 2. The 395 Shaft is located within 30 feet of Highway 395 in the center of town and is reported to be 1,600 feet deep (Gum, 2006). BLM recently placed emergency fencing around the shaft. The Claire Mine had a maximum arsenic concentration of 7,718 mg/kg on the northwest side, but waste rock associated with the 395 Shaft had an arsenic maximum of 814 mg/kg. Arsenic is especially elevated at the Claire Mine averaging 4,239 mg/kg. The volume of the 395 Shaft dump was estimated at 5,000 +/- 20% cubic yards and the volume of the Claire Mine dump is approximately 32,000 +/- 20% cubic yards. Further characterization will be needed prior to implementing any final actions.

4.8 Geoprobe Samples

Depth samples from the Geoprobe varied significantly. Refusal depths were as follows: 1-1BB 3 feet, 1-2B 15 feet, 1-3B 12 feet, 4-1B 6 feet, 4-1C 6 feet, 5-2C 8 feet, and 6-2B 4 feet. The only observation that can be made is that the arsenic concentration dropped to background when refusal/native soils were encountered. The tailings at depth were dry and had similar appearance throughout the profile (see photographs).

4.9 Quality Assurance

The XRF data were evaluated for quality assurance per EPA Method 6200. 27 split samples, or eleven percent, were sent to Chemex Laboratories for laboratory confirmation. These results are shown in Table 4. The comparison was made via linear regression per EPA Method 6200. The comparison to the XRF results was very favorable. For waste source samples, the XRF arsenic results were about 1% percent low, and R^2 was 0.983. For background samples, the XRF results were about 20% low, and the R^2 was 0.92. The blanks were acceptable and non-detect for all metals. Based on percent deviation from certified NIST standards, chromium, nickel and mercury detections were rejected (Table 4). The accuracy via the medium concentration certified standard was good for arsenic (%D: -2) and slightly high for the high concentrations standard (%D: 22), but the linear regression of the laboratory split samples was very good and takes precedence.

4.10 Laboratory Analytical Results

For each Area, one composite area-wide surface sample was analyzed via XRF, ALS Chemex, and ACZ Laboratory using EPA Method 6020. ACZ Laboratory results were used to confirm the Chemex results and to provide additional sample analyses on key composite samples (one for each of the five Areas sampled and for sample 2-OP-3. Table 4 shows the comparison of these results using linear regression as specified in EPA Method 6200. The ACZ Laboratory split sample results compared favorably with the Chemex laboratory results with a R^2 of 0.997 and a bias of 0.96 (ACZ results about 4 percent higher). These data indicate the Chemex splits and XRF results are data quality level III.

According to preliminary speciation work by USGS (Rytuba, 2006), the arsenic in Area 1 is arsenopyrite. The hard crust on the surface of the tailings is cemented by gypsum, barite, amorphous silica and magnesium-aluminum silicates. Area 4 arsenic is associated with ferrihydrite. Arsenic in waste rock is associated with pyragyrite (a silver-antimony sulfide). Arsenic bioaccessibility of the area 1, 2, 4, 5 and 6 composites was 24%. 33%, 25%. 8%, and 11%, respectively (Drexler, 2006).

Complete Chemex laboratory results are shown in Table 5. ACZ Laboratory results are shown in Table 6. As a measure of leaching, the California WET test was performed with deionized water. Arsenic deionized water WET results showed a range of <0.04 to 5.23 mg/L. The ratio of composite leachable arsenic to total arsenic concentrations averaged about 0.03 percent leachable and the one opportunity waste sample 2-OP-3 from the leach vat area leached about 2 percent arsenic. No other WET concentrations were significant. Sample 2-OP-3 was analyzed for total cyanide because of its location and because of the bluish streaks. It contained 40 mg/kg total cyanide which is much less than the EPA residential PRG. All of the composite samples and waste samples had circumneutral pH.

5.0 STREAMLINED RISK ASSESSMENT

As lead agency for the site, BLM has conducted a streamlined risk assessment in accordance with EPA's guidance for conducting non-time critical removal actions (EPA, 1993). This risk assessment includes an evaluation of chemicals of concern, exposure pathways and a site conceptual model and comparison to existing standards and criteria.

Mining activities from the Kelly Mine have probably made an impact since the mine was discovered in 1919. Mine and mill tailings generated from area mining activity has contributed heavy metals into water, stream sediments and soils. The site is frequently visited by recreational users especially on weekends and holidays. Recreational users generally may come into contact with the tailings by several exposure pathways and types of activities, particularly soil ingestion and inhalation of dust. To address these issues, BLM has published acceptable multi-media risk management criteria (RMCs) for the chemicals of concern (COCs) as they relate to human use and wildlife habitat on or near BLM lands (Ford, 2004). Activities evaluated include camping, boating, swimming, and all types of off road vehicle use (ORV). The most inclusive and restrictive of these is the camper scenario which assumes a 14-day exposure duration. Campers and ORV drivers may be exposed via soil ingestion and inhalation. Adults may inhale dust during dry periods; they may accidentally ingest soil by hand-to-mouth activities including eating, drinking and smoking; and small children may ingest larger amounts of soil than adults.

The COCs and migration pathways were identified from historical information and site evaluation. The COC selection process utilized chemicals documented to have been released to surface water and observed contamination in tailings at the site. Potential receptors, receptor exposure routes, and exposure scenarios were identified from on-site visits and discussions with BLM personnel. Representative wildlife receptors at risk were chosen using a number of criteria, including likelihood of inhabitation, and availability of data.

The area is used currently for off-road vehicles and hiking and exploring the old mining mill. Recreational demands are expected to increase at the site where exposure to metal concentrations in tailings and waste rock may exist. Dust reportedly blows from Area 1 toward the residential area when off road vehicles are active on the site e.g. weekends and holidays. Figure 6 is the site conceptual model for exposure to mining waste at the site. The COCs for the site were selected by comparing background concentrations and EPA Preliminary Remedial Goals (PRGs) to the sample results in and around the site, Table 5. The Area 1, 2 and 4 COCs mine wastes are arsenic and antimony. The only Area 5 and Area 6 potential COC is tungsten, but there is no EPA reference dose or PRG for tungsten, hence it was not evaluated further.

Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet. Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso. Skin contact with inorganic arsenic may cause redness and swelling. Several studies have shown that ingestion of inorganic arsenic can increase the risk of skin cancer and cancer in the lungs, bladder, liver, kidney and prostate. Inhalation of inorganic arsenic can cause increase risk of lung cancer. The Department of Health and Human Services (DHHS) has determined that inorganic arsenic is a known carcinogen. The International

Agency for Research on Cancer (IARC), and the EPA have determined that inorganic arsenic is carcinogenic to humans (ATSDR 2006).

RMCs for soil, sediment, fish and water protective of human receptors for the metals of concern were developed using available toxicity data and standard U.S. Environmental Protection Agency (EPA) exposure assumptions. Acceptable soil and sediment concentrations protective of wildlife receptors (ecological RMCs) for the metals of concern were developed using toxicity values and wildlife intake assumptions reported in the current ecotoxicology literature.

5.1 Human Health Risk Assessment

There are two types of risk associated with the Kelly Mine Tailings: off-site risk and on-site risk. Off-site risk is associated with releases of tailings into residential areas and Red Mountain Wash that drains the site. Due to a lack of adequate run-on and run-off controls, major flood events appear to have sent sufficient flows to erode the tailings and flush heavy metals-contaminated tailings into the town of Red Mountain and downstream.

Several on-site human risk scenarios were also developed to provide realistic estimates of the types and extent of exposure which individuals might experience to the metals of concern in the water, soils, and sediments on BLM property. Such exposures might occur to individuals who use BLM lands for off road vehicles, hiking, and exploring the mine site. Contamination appears to have migrated from Area 1 onto adjoining properties.

Sample results were compared to potential ARARs such as EPA PRGs for residential and industrial use and to BLM RMCs for recreational use.

The RMC correspond to either a target excess cancer risk level of 1×10^{-5}, or a target noncancer hazard index of 1.0. In the case of metals posing both carcinogenic and noncancer threats to health, the lower (more protective) concentration was selected as the RMC. The concept behind the RMC is that people will not experience adverse health effects from metal contamination on BLM lands in their lifetimes, while exposure is limited to soil, sediments, and waters with concentrations at or below the RMC. A target excess cancer risk of 1×10^{-5} means that for an individual exposed at these RMC, there is only a one in a hundred thousand chance that he would develop any type of cancer in a lifetime as a result of contact with the COCs. A hazard index of <1.0 means that the dose of noncancer metals assumed to be received at the site by any of the receptors in a medium is lower than the dose that may result in any adverse noncancer health effects. The RMC is protective for exposures to multiple chemicals and media. Lead RMC for the child receptors were determined from EPA's Integrated Exposure Uptake Biokinetic Model (USEPA, 1993) and other EPA regulations and guidance.

5.2 Ecological Risk Assessment

Wildlife in the Kelly Mine area and downstream may be exposed to metal contamination via several environmental pathways. The potential exposure pathways include soil and sediment ingestion, vegetation ingestion, and ephemeral surface water ingestion. Ecological RMCs have been established for metals in soil and sediments. This has been accomplished using the best data available, including: ecotoxicological effects data for the metals of concern, wildlife receptors representative of the

Mojave ecosystem, body weights and food intake rates for each receptor, and soil ingestion rates for each receptor. Among the wildlife receptors evaluated for this area are: deer mouse, mountain cottontail, and bighorn sheep.

The literature was surveyed for toxicity data relevant to either wildlife receptors at the site or to closely related species. In the absence of available toxicity data for any receptor, data were selected on the basis of phylogenetic similarity between ecological receptors and the test species for which toxicity data were reported. Soil ingestion data for each receptor were obtained from a recent study on dietary soil content of wildlife from the U.S. Fish and Wildlife Service (Beyer, et. al., 1994). Where no dietary soil content data were available for a particular receptor, the soil content was assumed to be equal to that of an animal with similar diets and habits. The amount of soil ingested by each receptor was estimated as a proportion of their daily food intake (Beyer, et. al., 1994). The food intake in grams for each receptor was calculated as a function of body weight (Nagy, 1987).

RMCs were calculated for each chemical of concern in soil based upon assumed exposure factors for the selected receptors, and species- and chemical-specific toxicity reference values (TRVs). Essentially, the TRVs represent daily doses of the metals for each wildlife receptor that will not result in any adverse toxic effects. TRVs were computed by metal of concern for each wildlife receptor/metal combination for which toxicity data were available. Phylogenetic and intraspecies differences between test species and ecological receptors have been taken into account by the application of uncertainty factors in derivation of critical toxicity values. These uncertainty factors were applied to protect wildlife receptors which might be more sensitive to the toxic effects of a metal than the test species. The uncertainty factors were applied to the test species toxicity data in accordance with a method developed by BLM. In accordance with this system, a divisor of two (USEPA, 1990) was applied to the toxicity reference dose for each level of phylogenetic difference between the test and wildlife species, i.e. individual, species, genus, and family.

The median wildlife RMCs for soil and sediment are found in Table 7. A Natural Resources Damage and Restoration Scoping Report is contained in Attachment 3.

5.3 Uncertainty Analysis

Toxic doses for each metal were selected from the literature without regard to the chemical speciation that was administered in the toxicity test.

The process of calculating human health RMCs, using a target hazard quotient and target excess lifetime carcinogenic risk, has inherent uncertainty. One major source of uncertainty is the arsenic valence, III or V; it is well known that arsenic III is more toxic than arsenic V. Another source of uncertainty is the bioavailability of the metals, particularly arsenic (Valberg et al 1997). Cumulative effects were quantitatively dealt with for the human assessment, although not all metals are elevated. Additionally, it is improbable that human receptors would be exposed concurrently via all possible exposure pathways, although this has been assumed for conservatism (Ford, 1996). The COCs may also have synergistic (or antagonistic) effects on human or wildlife receptors. There is uncertainty in deriving wildlife RMCs due to the lack of toxicity data for most wildlife species. A standard uncertainty factor approach was used for interspecies extrapolation (Ford, 1996).

5.4 Risk Assessment Results

Tailings and Soil:
EPA Region 9 has published PRGs that establish safe soil concentrations that are used for planning site cleanups (EPA, 2002). PRGs are established for residential and industrial types of land use appropriate for offsite areas. For onsite use, BLM uses various RMCs for recreational use, including all terrain vehicle (ORV) drivers and campers. The EPA PRGs are based on single chemical exposures and for carcinogens (arsenic) are established at 10^{-6} (one case per million exposed) cancer risk. The BLM RMCs are based on multiple chemicals and pathways and for arsenic, 10^{-5} cancer risk. Both PRGs and RMCs include ingestion and inhalation of soil. Neither of these have regulatory status but are "to be considered" applicable, relevant and appropriate requirements (ARARs).

The RMCs were prepared specifically for recreational use at BLM mining sites. Of these uses, camping for 14 days is considered the worst case. Table 7 compares the maximum media concentrations at the site with potential ARARs without accounting for bioaccessibility. The ratio of the environmental media concentration to the RMC is analogous to a hazard quotient (HQ) of 1.0; that concentration that should present negligible risk. Per the BLM RMC Technical Note, media concentrations exceeding RMCs for humans or wildlife by 1-10 times (low to moderate risk) are flagged in yellow; these occurrences may pose a chronic threat. Media concentrations exceeding RMCs by more than 10 (high risk) and 100-fold (extremely high risk) for humans or wildlife are flagged in orange and red, respectively. The BLM reference indicates that if the criterion is exceeded by 1-10 times the criteria, the site is moderate risk and if >100 times the criteria, the site is extremely high risk (Ford, 2004). In Table 7, PRG HQs are flagged in similar manner.

Of the metals detected in tailings, arsenic is by far, the principal chemical of concern for human health with a risk management criterion (RMC) of 20 mg/kg for a 14-day camper, 300 mg/kg for the ORV user and 0.39 mg/kg for the residential PRG. The 14-day camper scenario is the longest period a person may camp on BLM land at a given site. Using the mean XRF metals results, arsenic mine waste exceedances of camper and ORV RMCs are in the high and very high risk ranges for campers and moderate for ORV drivers in Areas 1, 2, 4 and 7. If EPA PRGs are used, risks are very high for residential or industrial uses. Note BLM did not sample residential areas, but did sample adjacent to residential areas and hence it is reasonable to compare to PRGs. For antimony, moderate risk is seen for camper and residential use. The arsenic is 25-33% bioavailable based on bioaccessibility results. Soils with high iron oxide content and lower soil pH have lower bioaccessibility (Zang, 2005). Soil and mine waste at the site show high iron content and neutral pH.

While the on-site soil risk has a medium rating to ORV drivers, risk to campers is moderate to high. Tailings are migrating off-site into residential areas. The tailings are situated adjacent to the residential lots in Red Mountain and appear to have been mobilized in flood events with impacts to downstream property owners. Potential off-site risk must be considered in additional studies.

For ecological risk, Table 7 compares mean area arsenic concentrations to a median wildlife RMC (Ford, 2004) for arsenic. The risks are in the moderate range (HQ 1-10). EPA has published a mammalian Soil Screening Level (SSL) for arsenic of 47 mg/kg, however background arsenic at the site is 136 mg/kg. SSLs are very conservative screening values. Had the arsenic SSL been used, the HQ would be in the high range (HQ 10-100). For antimony, since no RMC exists, the EPA SSL 0.27 mg/kg was used and risks are in the high (HQ 10-100) to very high range for wildlife (HQ >100) depending on location. Background antimony is 8.3 mg/kg. For these reasons, SSL HQs are considered possible upper bound risks.

Desert tortoise and Mojave ground squirrel are two threatened species that may be present at the site. Based on studies by Berry (2001) arsenic may be a factor in tortoise disease. Arsenic concentrations differ significantly by tissue type and concentrate in scutes. Ill tortoises had significantly higher arsenic scute concentrations than did healthy/control tortoises. However, when the three tissue types in control tortoises were compared with the four different types of diseases, there were no significant differences by disease type. All ill tortoises showed elevated levels of arsenic. Arsenic concentrations differed significantly by desert region and tissue type. Tortoises from both the West and East Regions contained elevated levels of arsenic. Understanding of the role of potentially toxic elements, such as arsenic, and the cumulative and/or synergistic effect of multiple potentially toxic elements is at a rudimentary stage. Studies are needed to know much more about toxicity levels in the tortoise, elemental accumulation by size and age class, pathways in the environment, and why such problems are appearing now, and whether and how arsenic and other elements contribute to disease processes and survivorship.

Although the RMC and SSL are for mammals, there are no soil criteria for reptiles that could represent the tortoise. Tortoise RMCs would probably be higher and the HQ lower than mammal criteria because of low metabolic rate and higher proportional skeleton/carapace weight. The 1000-2000 mg/kg arsenic concentrations in the tailings and mine waste exceed published phytotoxicity benchmarks of 50 mg/kg (Kabata-Pendias and Pendias, 1992), and 200 mg/kg in clay soils (Sheppard, 1992) which explains the lack of vegetation in Areas 1 and 4.

5.5 Justification for the Removal Action

The project was developed by the BLM using its delegated authority under CERCLA to assess impacts to human health and the environment posed by the tailings and mine waste. BLM has elected to use its CERCLA authority for the Kelly Mine site to determine if a potential exists for a release or threat of a release of CERCLA hazardous substances and to address the need for removal actions. A release of arsenic and antimony has occurred in Areas 1, 2, 4 and 7. A release of tungsten has occurred in Areas 5 and 6. These releases have occurred from migration from rock dumps and tailings. In accordance with Section 300.415(b)(2)(i-viii) of the NCP, a removal action is selected when one of the following criteria is satisfied:

- Actual or potential exposure to nearby populations, animals or the food chain from hazardous substances, pollutants or contaminants: *Analytical results from over 200 samples show high concentrations of arsenic are found in Areas 1, 2 and 4 and analytical and visual observations indicate the mine waste has migrated onto residential property in Red Mountain. Arsenic poses high risk to recreational visitors and potentially very high risk to adjacent residents. Access to these areas is unrestricted and off-road vehicles use these areas, especially Area 1 located nearest the residences of Red Mountain. Analytical results from more than 50 samples show Areas 5 and 6 contribute much less risk and are of much lower priority.*

- Actual or potential contamination of drinking water supplies or sensitive ecosystems: *Similar to the above, evidence is found indicating potential habitat contamination of desert tortoise and Mojave ground squirrel in Areas 1, 2 and 4, with lesser contamination in Areas 5 and 6. Drinking water in the area is supplied by the Rand Community Water District. The water source for the Water*

District is located external to area and is not affected by the site.

- Hazardous substances in drums, barrels, tanks or other bulk containers that may pose a threat of release: *No containers found. There is a large amount of trash, scrap material and temporary buildings in Area 2 and numerous empty tanks in Area 6.*

- High levels of hazardous substances, pollutants, or contaminants in soils largely at or near the surface that may migrate: *Abundant evidence of high concentrations of arsenic in tailings and mine waste that is migrating off-site into residential areas via erosion and from particulates associated with off-road vehicles based on complaints from residents. Over 46,000 cubic yards of arsenic tailings have migrated off-site.*

- Weather conditions that may promote migration of hazardous substances: *Every precipitation event allows migration of tailings off-site into a residential area.*

- Threat of fire or explosion: *Little or none.*

- Availability of other appropriate Federal or State response mechanisms to respond to the release: *BLM has requested that EPA perform sampling on affected residential properties and to take necessary measures to protect human health.*

- Other situations or factors that may pose threats to public health, welfare or the environment: *None.*

6.0 RECOMMENDATIONS

Due to the urgency of the site, it is recommended the following time-critical actions be performed as soon as possible to reduce exposure to arsenic in the mine waste and to reduce off-site migration:

- Sample residential properties for soil and other media as appropriate,
- Administratively close and sign Areas 1, 2, 4 and 7.
- Fence Area 1, the mill and Claire Mine dumps with 6-foot chain link fence and 3-strand barbed wire to keep visitors off the site and to prevent dust from off-road vehicle use on the site.
- Fence the glory hole and open shafts in Area 2,
- Repair the breach in the tailings dam,
- Install run-on controls upstream of the tailings and mill area,
- Install run-off controls and a culvert to direct migration away from residences and under Highway 395
- Remove mine waste from the 395 shaft and complete safety closure.

BLM has requested EPA sample private property, especially residential lots to determine if any action is warranted. The remaining measures will prevent the waste from migrating and reduce on-site risk on an interim basis. In order to accomplish a permanent removal action, it is recommended that an Engineering Evaluation/Cost Analysis be performed to study non-time critical removal alternatives.

6.0 REFERENCES

Agency for Toxic Substances and Disease Registry. 2005. ToxFaqs for Arsenic. (http://www.atsdr.cdc.gov).

Alloway, B.J. ed. 1995. Heavy Metals in Soils, Second Edition. Chapman and Hall, Glasgow, UK.

Berry, K. H., B. L. Homer, W. Alley, M. Chaffee, and G. Haxel, 2001. Health and Elevated Mortality Rates in Desert Tortoise Populations, The Role of Arsenic and Other Potential Toxicants, Abstract for Arsenic Group Meeting, Denver Federal Center.

BLM, 2006. Sampling and Analysis Plan for Red Mountain. National Science and Technology Center, Denver, CO.

Ford, K., 2004. Risk Management Criteria for Metals at BLM Mining Sites, Technical Note 390. National Science and Technology Center, Denver, CO.

Bureau of Land Management, 2004. Quality Assurance Project Plan for BLM Abandoned Mine/Removal PA/SI Activities, National Science and Technology Center, Denver, CO.

Gum, Linn, 2006. Personal Communication.

Hargas Associates, 1998. Monitoring Results, Rand Mine.

Hulin, C.D., 1925. Geology and Ore Deposits of the Randsburg Quadrangle, California. California State Mining Bureau Bulletin 95.

Kabata-Pendias, A., and H. Pendias, 1992. Trace Elements in Soil and Plants, 2nd edition, CRC Press, Boca Raton, FL.

Kelly, Chris, 2006. Personal Communication to Peter Graves, BLM Ridgecrest Field Office.

Reller, Greg, 2006. Personal Communication.

Ruby et al, 1993. Environmental Science and Technology, vol 27, no 13, pp 2870-2877.

Rytuba, Jim, 2006. Personal communication.

Shacklette, H.T., and J.G. Boerngen, Element Concentrations in Soils and other Surficial Materials of the Conterminous United States, USGS Professional Paper 1270, Washington D.C.

Sheppard, S.C., 1992. Summary of Phytoxic Levels of Soil Arsenic, Water, Air, and Soil Pollution 64, 539-550.

Smith, K., C. A. Ramsey, P. L. Hageman, 2000. Sampling Strategy for the Rapid Screening of Mine Waste Dumps on Abandoned Mine Lands. Proceedings from the 5th International Conference on Acid Rock Drainage, Denver, CO.

U.S. Environmental Protection Agency. 1980, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," PB97-156111GEI.

U.S. Environmental Protection Agency. 1987. A Compendium of Superfund Field Operations Methods. OSWER Directive 9355.-14.

U.S. Environmental Protection Agency. 1990. Quality Assurance/Quality Control Guidance For Removal Activities (April 1990), OSWER Directive 9360.4-1, EPA/540/G-90/004, PB90-274481.

U.S. Environmental Protection Agency. 1991. Management of Investigation-Derived Wastes During Site Inspections. EPA/540/G-91/009.

U.S. Environmental Protection Agency. 1993. Data Quality Objectives Process for Superfund. Interim Final Guidance. EPA540-R-93-071.

U.S. Environmental Protection Agency. 1994. General Field Sampling Guidelines, SOP #2001, Rev. #0.0.

U.S. Environmental Protection Agency. 1994. Sampling Equipment and Decontamination, SOP #2006, Rev. #0.0.

U.S. Environmental Protection Agency. 1994. Soil Sampling, SOP #2012, Rev. #0.0.

U.S. Environmental Protection Agency. 1996. Soil Screening Guidance: Technical Background Document, OSWER Directive 9355.4-17A.

U.S. Environmental Protection Agency, 2006. Eco-Soil Screening Levels for Arsenic and Antimony. http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_arsenic.pdf

Valberg, P.A. et al, 1997. Issues in Setting Health Based Cleanup Levels for Arsenic in Soil. Regulatory Toxicology and Pharmacology 26, 219-229.

Western Regional Climate Center. 2001. Period of Record Monthly Climate Summary. (Wrcc@dri.edu).

Yang, J.K., Barnett, M.O., Zhuang, J.L., Fendorf, S.E., and Jardine, P.M., 2005. Adsorption, oxidation, and bioaccessibility of As(III) in soils, Environ. Sci. Technol., 39 (18): 7102-7110.

Attachment 1: Figures

Figure 2: Site Layout and Features Areas 1, 2, and 7

Figure 3: Site Layout and Features Areas 4, 5 and 6

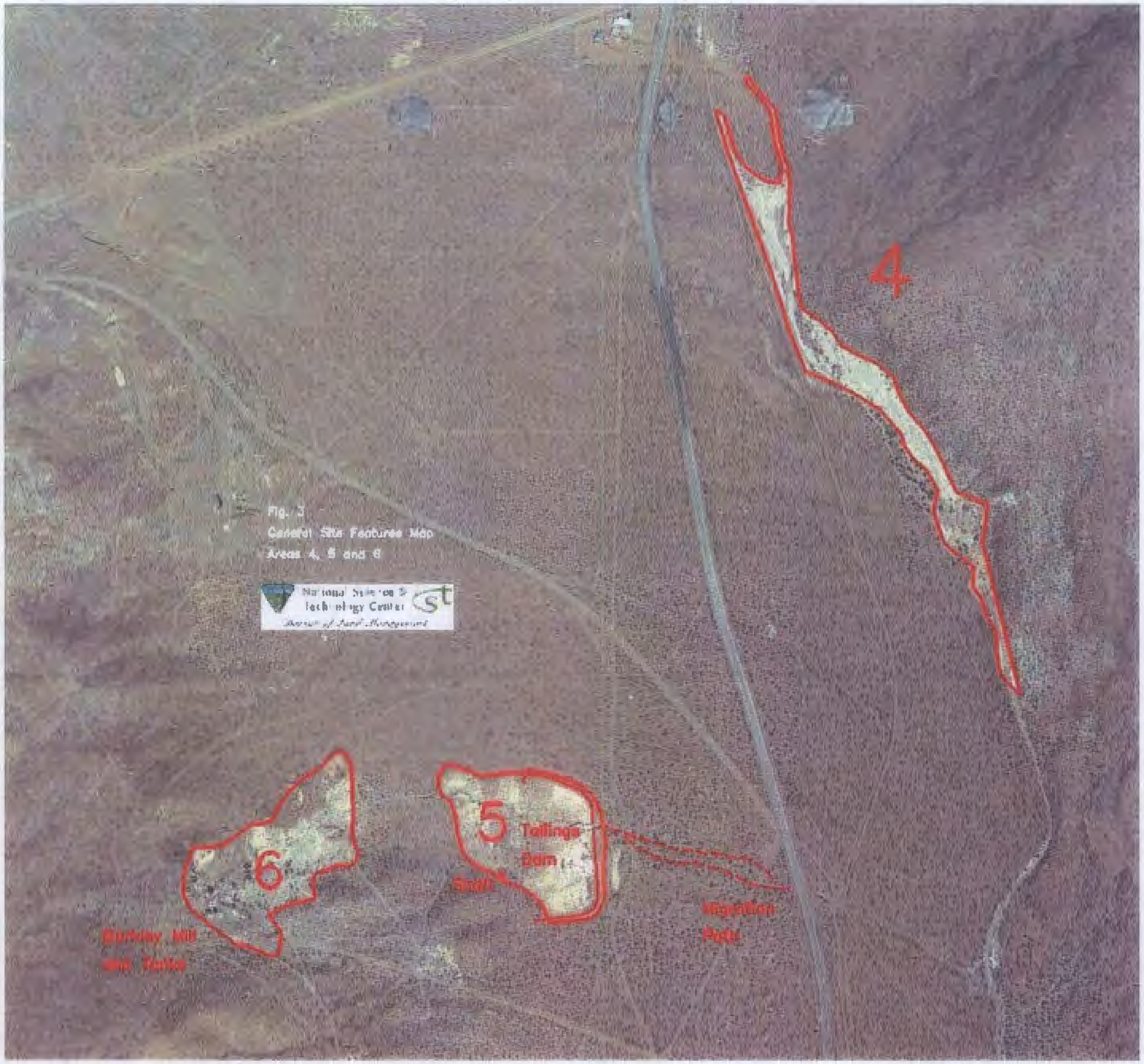


Figure 4: Sample Locations Areas 1, 2, and 7

Figure 5: Sample Locations Area 4

ERROR: undefined
OFFENDING COMMAND: ec

STACK:

Figure 6: Sample Locations for Areas 5 and 6

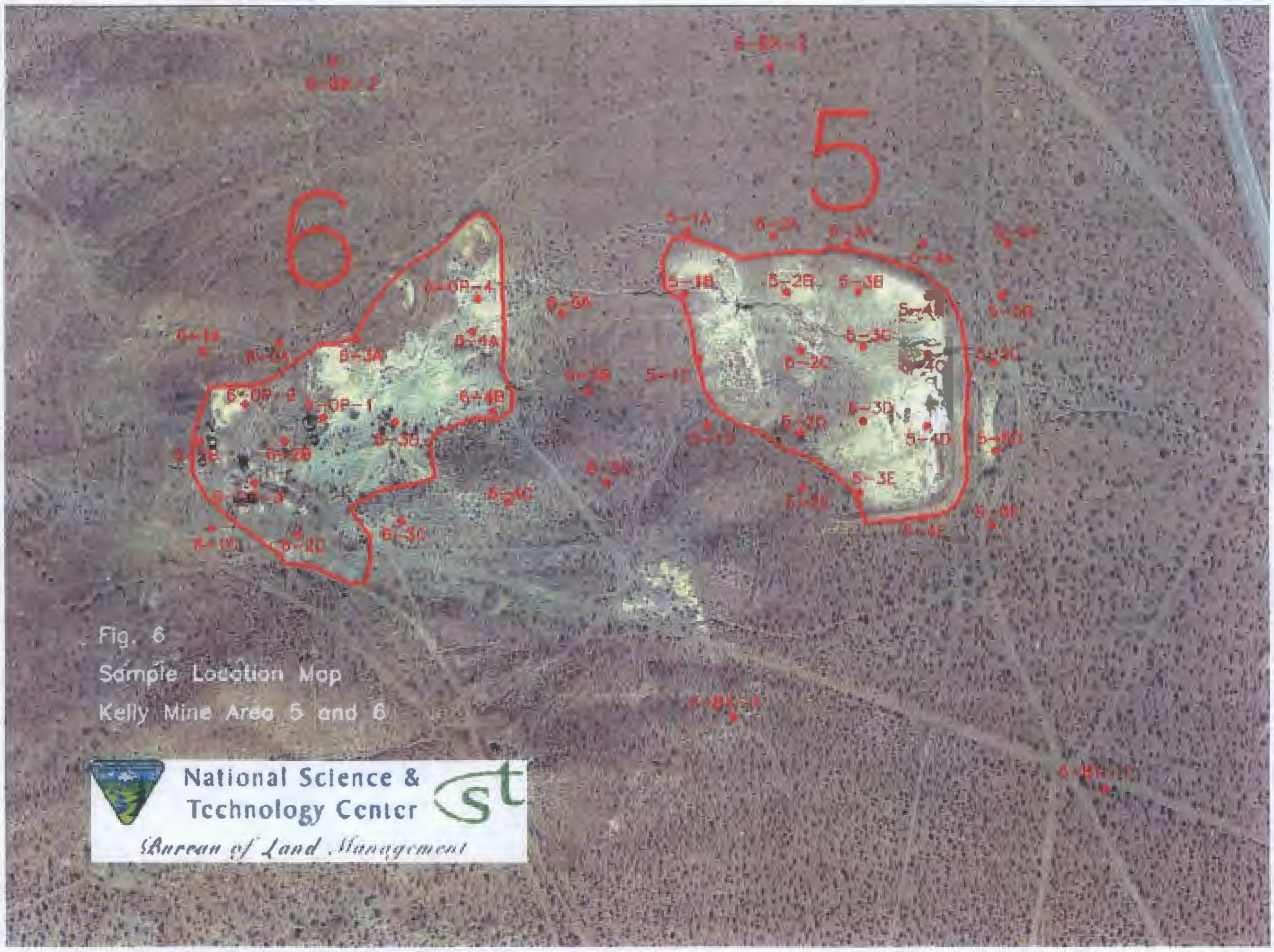
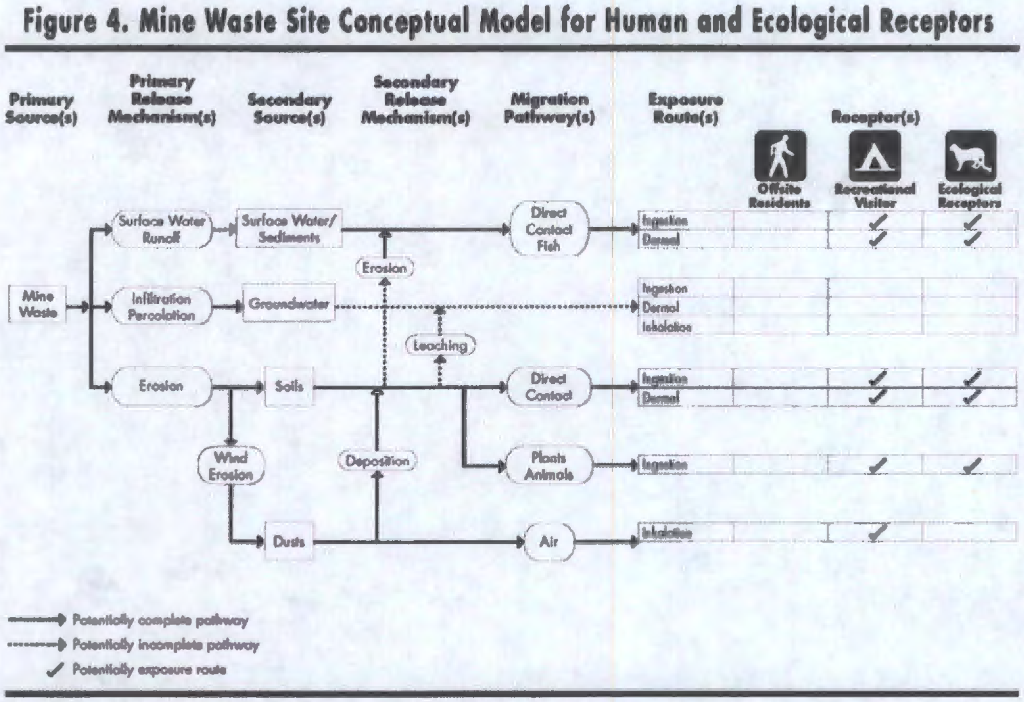


Figure 7: Site Conceptual Model



Attachment 2: Site Photographs

1. Sampling Area 1.

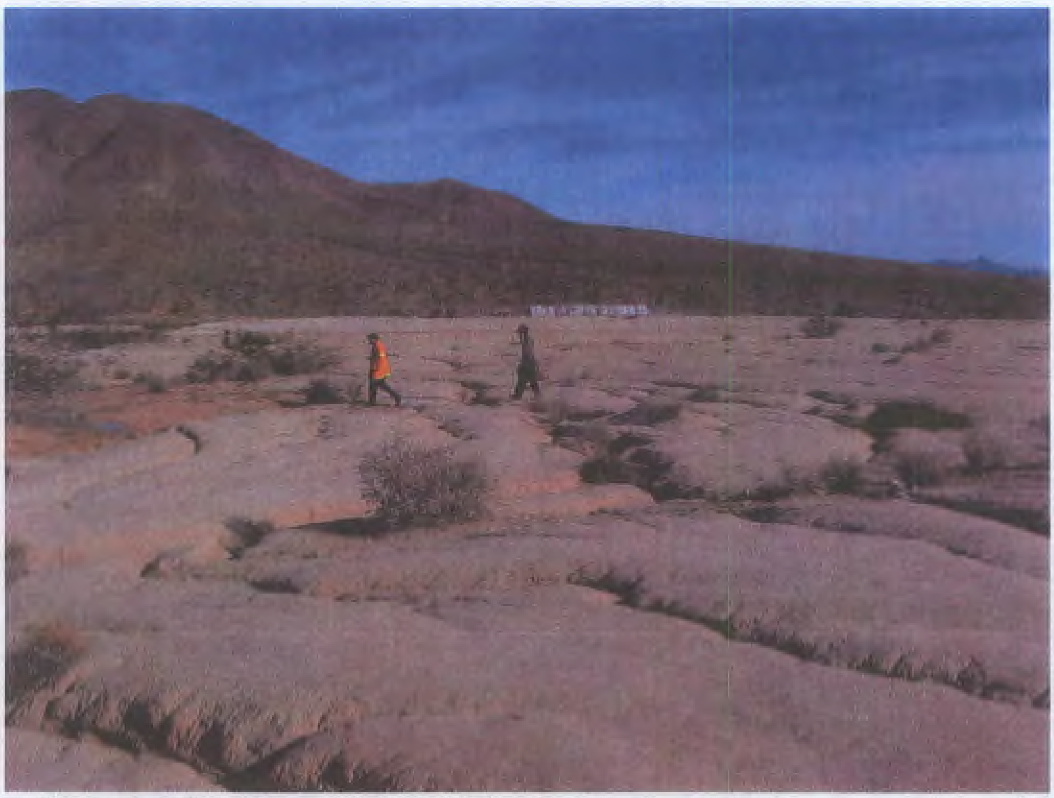

2. Area 2 large waste rock dump looking northwest.


3. Area 1 eastern perimeter sampling transect 4 near residential boundary.

4. Area 1 top of tailings dam looking east into residential area.

5. Breach in Area 1 tailings dam through which tailings flow onto residential area.

6. Evidence of off road vehicle use in Area 1.



7. San Berndadino Hazmat samplers on surface of Area 1 showing crust and erosional gullies.

ERROR: undefined
OFFENDING COMMAND: ec

STACK:

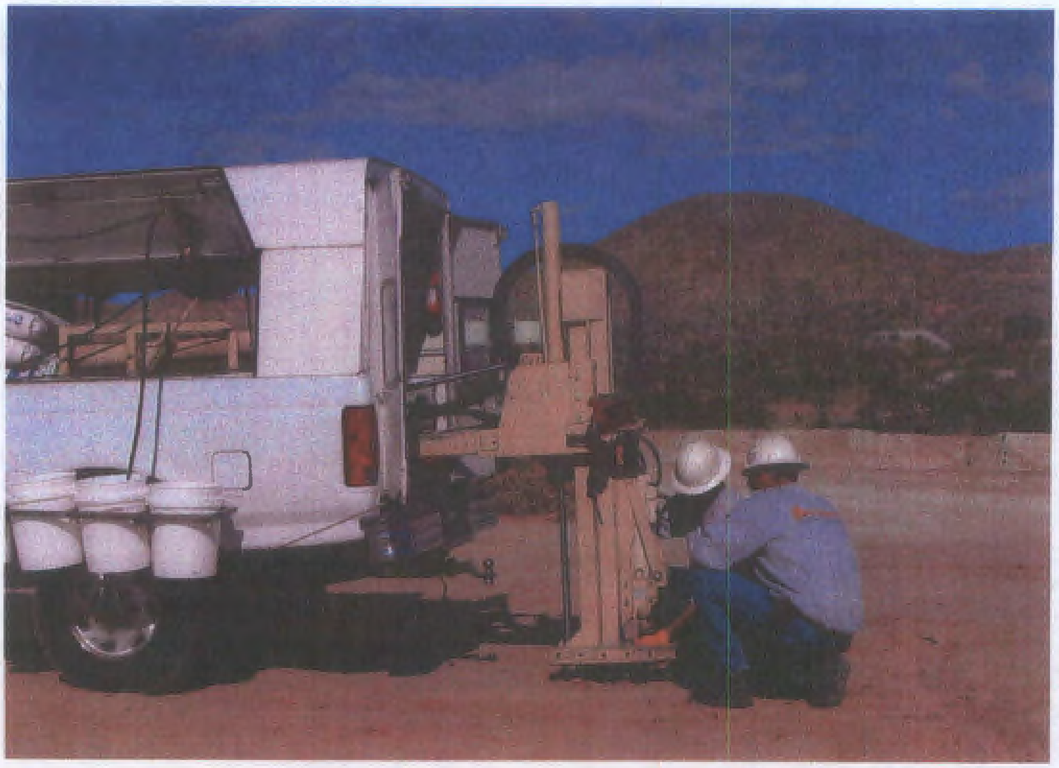
10. Glory Hole in Area 2.

11 and 12. Open shafts Area 2.

12. Open shaft Area 2.

14. Kelly Mill with Red Mountain in back looking east.

15. Geoprobe sampling Area 1.



ERROR: undefined
OFFENDING COMMAND: ec

STACK:

18. Area 5 looking west.

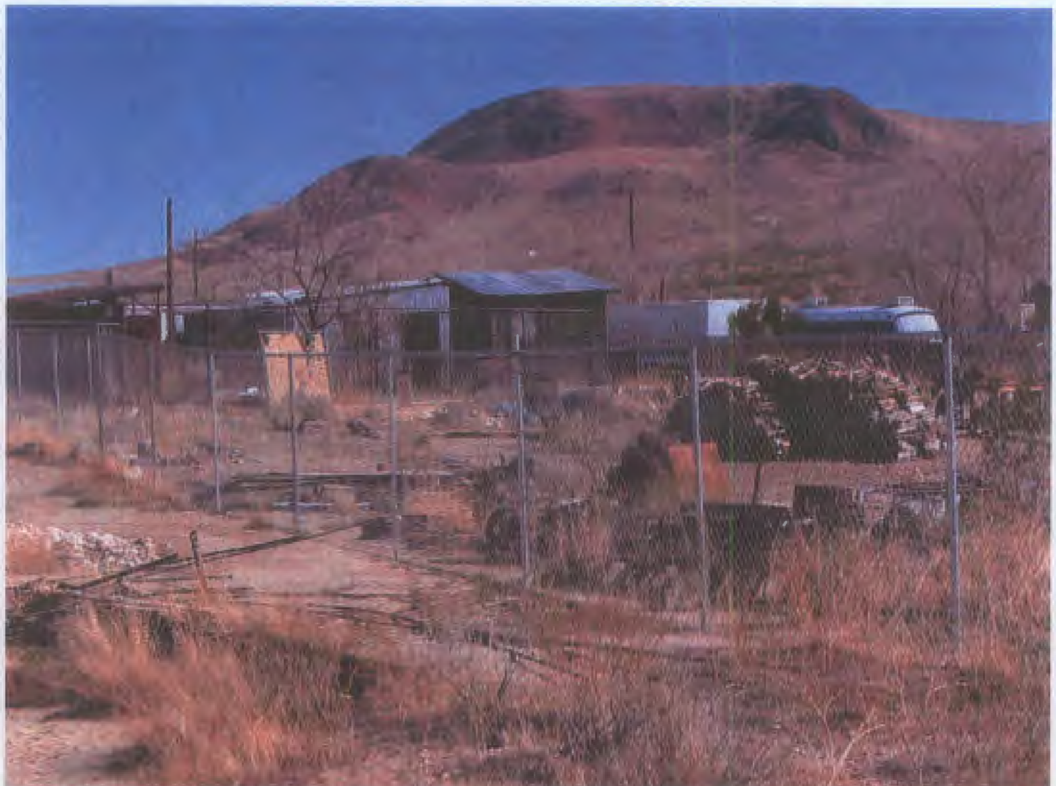

19 and 20. Geoprobe sampling Area 6.


20. Sampling Area 6.

ERROR: undefined
OFFENDING COMMAND: ec

STACK:

23. Sampling 2-OP-1 white pile.



24. Dataram particulate air monitor mounted on 3rd fencepost from right.

25. Southeast corner Area 1.

26. Area 4 looking north.

27. Area 6 looking west to mill foundation and tanks.

Attachment 3: Natural Resource Damage Assessment Scoping Report

ATTACHMENT 3
INJURY SCOPING REPORT

Resource Injury Scoping Report

It is BLM policy to complete a resource injury scoping report (see report form in Appendix 3) for sites where BLM makes a determination whether a CERCLA response (removal or remedial) action may be warranted. This report documents the results of the natural resource injury scoping process. The report indicates whether injuries to BLM resources or losses of services have occurred or are suspected, caused by a release of hazardous substances, and whether they can be restored within the response actions. If injuries or losses have occurred or are suspected, the report should list the specific resources thought to be injured or the services lost. If specific resources or losses are identified, the actions necessary to restore them within the response action also should be identified. The report should be completed prior to the time when removal action needs are planned, and placed in the Case File and AR.

NRDA Injury Scoping Report Form

1. Site Name/Location: **Report Date:**
Kelly Mine____________________ /____3/20/06__________

2. BLM Coordinator/Office: Peter Graves, Ridgecrest Field Office________________

3. Signature of Approving Manager Verifying Injury Scoping Completion:

(Print)________________________ (Sign) ________________________

4. Site/Setting/Description:
See RSI____

5. Description of CERCLA Release (what, where, toxicity, persistence):

High concentrations of arsenic (1000-8000 ppm in mine waste) desert tortoise and Mojave Ground squirrel habitat. Over 40,000 cubic yards of tailings have migrated into Red Mountain Wash.

6. Natural Resource Injury Scoping:

_____ a. No resource injury suspected to resources
__x__ b. Injury suspected for potentially affected resources

7. Natural Resources/Services Potentially Injured/Lost (list/briefly describe):
Possible loss of habitat to endangered species______________________

____

8. Y x / N __   Is the BLM taking CERCLA response actions?

9. Description of restoration needs by injured resource/lost service:
To be determined____

____

10. Other trustees and resource interests:
FWS for endangered species____

____

11. Potentially Responsible Party (PRP) information:
PRP search in progress____

____

Attachment 4: Tables

Figure 4A. Waste Rock Sampling Locations, Areas 1, 2, and 7.

Kelly Mine GPS Points 2006.03.23 Draft... Scale: 0 100 200 300 400 500 Feet

U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT
California State Office
Sacramento, California
www.ca.blm.gov
Date Prepared: 3/23/2006
Project: kellyminepts20060323.mxd

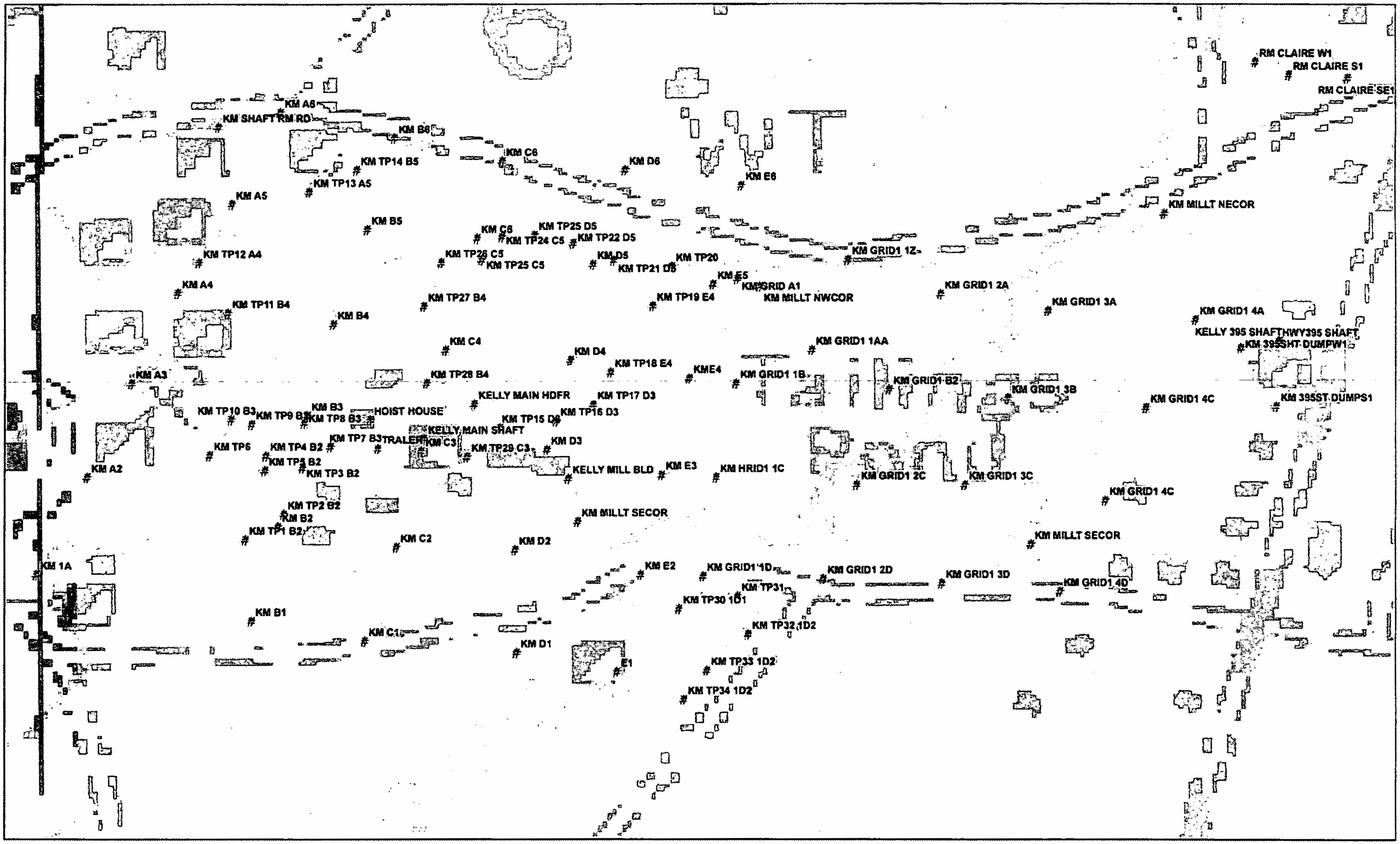


Table 3. XRF Analytical Results, Kelly Mine, mg/kg

Sample	Ssec	Date/Time	Pb	Se	As	Hg	Zn	Cu	Fe	Mn
BLM RMC Camper			**400**	**35**	**20**	**40**	**40000**	**5000**	**NA**	**960**
TTLC			**1000**	**100**	**500**	**20**	**5000**	**2500**	**NA**	**NA**
Background[1]			**20**	**0.3**	**5.5**	**0.046**	**55**	**21**	**21000**	**380**
Area Grid, QA, Opportunity and Background Samples										
2710	65	2/13/2006	5347	<LOD	673	<LOD	6605	3189	31795	11398
BLK	29	2/14/2006	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD
Area 1										
1-1A	50	2/14/2006	<LOD	<LOD	242	<LOD	51	<LOD	15693	<LOD
1-1B	64	2/14/2006	<LOD	<LOD	46	<LOD	<LOD	<LOD	13197	<LOD
1-1C	61	2/14/2006	<LOD	<LOD	2120	<LOD	55	<LOD	16192	<LOD
1-1D	61	2/14/2006	22	<LOD	690	<LOD	90	<LOD	10195	<LOD
1-1AA	61	2/14/2006	32	<LOD	1720	<LOD	102	<LOD	12896	<LOD
1-1Z	61	2/14/2006	<LOD	<LOD	169	<LOD	53	<LOD	14989	<LOD
1-2A	61	2/14/2006	26	<LOD	370	<LOD	75	<LOD	11795	<LOD
1-2B	61	2/14/2006	188	<LOD	1330	<LOD	399	147	17498	<LOD
1-2C	61	2/14/2006	63	<LOD	1290	<LOD	185	<LOD	13594	<LOD
1-2D	62	2/14/2006	<LOD	<LOD	60	<LOD	63	<LOD	15091	<LOD
1-2Z	60	2/14/2006	34	<LOD	389	<LOD	83	<LOD	16691	<LOD
1-3A	61	2/14/2006	30	<LOD	806	<LOD	80	<LOD	10099	<LOD
1-3B	60	2/14/2006	163	30	1110	<LOD	416	<LOD	14592	<LOD
1-3C	61	2/14/2006	38	<LOD	2210	<LOD	208	<LOD	13990	<LOD
1-3D	61	2/14/2006	41	<LOD	685	<LOD	47	<LOD	12896	<LOD
1-3Z	61	2/14/2006	<LOD	<LOD	97	<LOD	95	<LOD	11795	<LOD
1-4A	61	2/14/2006	<LOD	<LOD	852	<LOD	<LOD	<LOD	7456	<LOD
1-4B	61	2/14/2006	54	<LOD	1350	<LOD	108	<LOD	10598	<LOD
1-4C	61	2/14/2006	<LOD	<LOD	1010	R	100	<LOD	8128	<LOD
1-4D	60	2/14/2006	<LOD	<LOD	781	<LOD	77	<LOD	8979	<LOD
1-4Z	61	2/14/2006	<LOD	<LOD	567	<LOD	57	<LOD	10195	<LOD
Mean					852		123		12693	
1-BK-1	61	2/15/2006	<LOD	<LOD	92	R	<LOD	<LOD	19789	<LOD
Area 2										
2-1A	85	2/14/2006	<LOD	<LOD	115	<LOD	<LOD	<LOD	20595	<LOD

2-2A	71	2/14/2006	86	<LOD	56	<LOD	241	<LOD	21594	<LOD			
2-3A	65	2/14/2006	131	<LOD	211	<LOD	<LOD	<LOD	17293	<LOD			
2-4A	81	2/14/2006	<LOD	<LOD	290	<LOD	<LOD	<LOD	29594	<LOD			
2-5A	61	2/14/2006	<LOD	<LOD	92	<LOD	<LOD	<LOD	16090	<LOD			
2-6A	71	2/14/2006	28	<LOD	93	<LOD	<LOD	<LOD	19392	<LOD			
2-1B	63	2/14/2006	<LOD	<LOD	122	R	<LOD	<LOD	19200	<LOD			
2-2B	58	2/14/2006	<LOD	<LOD	442	<LOD	<LOD	<LOD	9254	<LOD			
2-4B	61	2/14/2006	93	<LOD	874	<LOD	<LOD	<LOD	24192	<LOD			
2-3B	97	2/14/2006	<LOD	<LOD	470	<LOD	<LOD	<LOD	8768	<LOD			
2-5B	61	2/14/2006	78	<LOD	121	R	<LOD	<LOD	22694	<LOD			
2-6B	83	2/14/2006	<LOD	<LOD	540	R	96	<LOD	18688	<LOD			
2-1C	70	2/14/2006	<LOD	<LOD	102	<LOD	<LOD	<LOD	16000	<LOD			
2-2C	63	2/14/2006	<LOD	<LOD	563	<LOD	55	<LOD	12698	<LOD			
2-3C	102	2/14/2006	<LOD	<LOD	76	R	<LOD	<LOD	19994	<LOD			
2-4C	66	2/14/2006	<LOD	<LOD	704	<LOD	<LOD	<LOD	37990	<LOD			
2-5C	65	2/14/2006	116	<LOD	221	<LOD	82	<LOD	20493	<LOD			
2-6C	62	2/14/2006	31	<LOD	792	<LOD	<LOD	<LOD	22093	<LOD			
2-1D	60	2/14/2006	<LOD	<LOD	124	<LOD	<LOD	<LOD	11494	<LOD			
2-2D	62	2/14/2006	<LOD	<LOD	712	<LOD	<LOD	<LOD	24998	<LOD			
2-3D	60	2/14/2006	<LOD	<LOD	205	<LOD	<LOD	<LOD	19098	<LOD			
2-4D	63	2/14/2006	<LOD	<LOD	1000	<LOD	<LOD	<LOD	40397	<LOD			
2-5D	62	2/14/2006	<LOD	<LOD	1530	<LOD	<LOD	<LOD	44493	<LOD			
2-6D	61	2/14/2006	44	<LOD	72	<LOD	<LOD	<LOD	16794	<LOD			
2-1E	61	2/14/2006	<LOD	<LOD	1050	<LOD	<LOD	<LOD	41677	<LOD			
2-2E	60	2/14/2006	45	<LOD	800	<LOD	106	<LOD	18790	<LOD			
2-3E	61	2/14/2006	29	<LOD	1630	<LOD	226	<LOD	12698	<LOD			
2-4E	65	2/14/2006	129	<LOD	3318	<LOD	149	<LOD	24000	<LOD			
2-5E	64	2/14/2006	29	<LOD	1080	<LOD	<LOD	<LOD	36378	<LOD			
2-6E	61	2/14/2006	<LOD	<LOD	90	<LOD	66	<LOD	19699	<LOD			
2-OP-1	61	2/15/2006	34	<LOD	373	<LOD	89	<LOD	17894	<LOD			
2-OP-2	67	2/15/2006	50	<LOD	970	<LOD	132	<LOD	17792	<LOD			
2-OP-3	62	2/15/2006	158	<LOD	2040	R	640	<LOD	18598	<LOD			
2-OP-4	61	2/15/2006	510	<LOD	5747	<LOD	<LOD	<LOD	40294	<LOD			
2-OP-5	62	2/15/2006	87	<LOD	452	<LOD	<LOD	<LOD	31078	<LOD			
2-OP-6	60	2/15/2006	136	<LOD	2509	<LOD	100	<LOD	39091	<LOD			
2-SUMP-1	60.6	2/17/2006	41	<LOD	4688	R	<LOD	<LOD	60467	<LOD			
Mean					926				24118				

2-BK-1	65	2/15/2006	<LOD	<LOD	73	<LOD	92	<LOD	24896	<LOD			
2-BK-2	61	2/15/2006	<LOD	<LOD	45	R	<LOD	<LOD	40397	<LOD			
2-BK-3	60	2/15/2006	57	<LOD	74	R	<LOD	<LOD	20698	<LOD			
Area 3													
U8-S	60.4	2/17/2006	<LOD	<LOD	580	R	<LOD	<LOD	25690	<LOD			
U8-N	61.1	2/17/2006	<LOD	<LOD	384	R	<LOD	<LOD	9850	<LOD			
U8-S	99.1	2/17/2006	<LOD	<LOD	391	R	<LOD	<LOD	20992	<LOD			
U4-S1	86.5	2/17/2006	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	19789	<LOD			
U8-S	48.9	2/17/2006	<LOD	<LOD	157	R	104	<LOD	30387	<LOD			
U4-S1	55.3	2/17/2006	<LOD	<LOD	<LOD	<LOD	67	<LOD	23795	<LOD			
U4-E1	40.9	2/17/2006	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	17395	<LOD			
Mean					378								
Area 4													
4-1A	68.8	2/17/2006	<LOD	<LOD	70	R	<LOD	<LOD	15898	<LOD			
4-1B	66	2/15/2006	<LOD	<LOD	2059	<LOD	<LOD	<LOD	17600	<LOD			
4-1C	60.4	2/17/2006	<LOD	<LOD	141	R	57	<LOD	17894	<LOD			
4-1E	60.9	2/17/2006	<LOD	<LOD	241	<LOD	<LOD	<LOD	8544	<LOD			
4-1F	60.9	2/17/2006	<LOD	<LOD	283	R	47	<LOD	22899	754			
4-1G	60.9	2/17/2006	<LOD	<LOD	126	<LOD	40	<LOD	20800	<LOD			
4-1H	60.6	2/17/2006	<LOD	<LOD	244	<LOD	<LOD	<LOD	18189	<LOD			
4-1I	66.9	2/17/2006	<LOD	<LOD	395	R	<LOD	<LOD	13990	<LOD			
4-1J	62.6	2/17/2006	<LOD	<LOD	780	R	73	<LOD	12800	<LOD			
4-1K	60.5	2/17/2006	<LOD	<LOD	2869	R	187	<LOD	11296	<LOD			
4-2A	60.9	2/17/2006	<LOD	<LOD	146	<LOD	<LOD	<LOD	20493	<LOD			
4-2C	60.7	2/17/2006	<LOD	<LOD	3000	R	<LOD	<LOD	6854	<LOD			
4-2D	91.6	2/17/2006	<LOD	17	626	R	327	579	5158	<LOD			
4-2E	60.4	2/17/2006	<LOD	<LOD	234	R	<LOD	<LOD	14490	<LOD			
4-2F	60.8	2/17/2006	<LOD	<LOD	3120	R	<LOD	<LOD	18099	<LOD			
4-2G	61	2/17/2006	<LOD	<LOD	4947	R	<LOD	<LOD	11200	<LOD			
4-2H	60.5	2/17/2006	<LOD	<LOD	4128	R	<LOD	<LOD	9728	<LOD			
4-2I	60.7	2/17/2006	<LOD	<LOD	3360	R	<LOD	<LOD	12294	<LOD			
4-2J	60.8	2/17/2006	<LOD	<LOD	1070	R	<LOD	<LOD	4688	<LOD			
4-2K	60.5	2/17/2006	<LOD	<LOD	1220	R	83	<LOD	12800	<LOD			
4-2L	60.7	2/17/2006	<LOD	<LOD	167	<LOD	<LOD	<LOD	20493	<LOD			
4-2M	60.8	2/17/2006	<LOD	<LOD	154	<LOD	53	<LOD	17498	<LOD			

4-3A	63.8	2/17/2006	<LOD	<LOD	110	R	<LOD	<LOD	16691	<LOD			
4-3B	61.3	2/17/2006	<LOD	17	1430	R	281	566	6726	<LOD			
4-3C	60.4	2/17/2006	<LOD	<LOD	537	R	<LOD	<LOD	12499	<LOD			
4-3D	60.6	2/17/2006	<LOD	<LOD	206	R	<LOD	<LOD	15194	<LOD			
4-3E	60.4	2/17/2006	<LOD	<LOD	101	R	56	<LOD	15795	<LOD			
4-3F	86.9	2/17/2006	<LOD	<LOD	331	R	29	<LOD	13594	<LOD			
4-3G	61.5	2/17/2006	<LOD	<LOD	363	R	68	68	16192	<LOD			
4-3H	60.7	2/17/2006	<LOD	<LOD	424	R	79	113	14899	<LOD			
4-3I	67.1	2/17/2006	<LOD	<LOD	178	<LOD	40	<LOD	16896	<LOD			
4-3J	93.5	2/17/2006	<LOD	<LOD	174	<LOD	<LOD	<LOD	17190	654			
4-3K	60.8	2/17/2006	<LOD	<LOD	251	<LOD	92	<LOD	15590	<LOD			
4-3L	60.7	2/17/2006	<LOD	<LOD	97	<LOD	<LOD	<LOD	16192	<LOD			
4-0A	62	2/17/2006	<LOD	<LOD	161	R	62	<LOD	14490	<LOD			
4-4B	60.5	2/17/2006	<LOD	<LOD	103	<LOD	<LOD	<LOD	15091	<LOD			
4-0D	60.4	2/17/2006	<LOD	<LOD	126	<LOD	38	<LOD	18291	<LOD			
4-0F	60.8	2/17/2006	<LOD	<LOD	496	R	54	<LOD	31283	<LOD			
Mean					907								
4-BK-1	60.9	2/17/2006	<LOD	<LOD	82	<LOD	42	<LOD	16294	<LOD			
4-BK-2	62.1	2/17/2006	<LOD	<LOD	145	<LOD	75	<LOD	16090	<LOD			
Area 5													
BLK	62	2/17/2006	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD			
2710	60.8	2/17/2006	5667	<LOD	878	R	7027	3338	35482	11098			
2711	112	2/17/2006	1120	<LOD	<LOD	R	296	112	22298	<LOD			
5-1A	61	2/15/2006	<LOD	<LOD	39	<LOD	<LOD	<LOD	17498	<LOD			
5-1B	62	2/15/2006	<LOD	<LOD	59	R	125	<LOD	17498	<LOD			
5-1C	61	2/15/2006	<LOD	<LOD	129	<LOD	80	<LOD	23898	<LOD			
5-1D	61	2/15/2006	<LOD	<LOD	71	R	79	<LOD	18893	<LOD			
5-2A	65	2/15/2006	<LOD	<LOD	48	R	108	<LOD	19494	<LOD			
5-2C	61	2/15/2006	<LOD	<LOD	57	R	114	<LOD	10797	<LOD			
5-2D	61	2/15/2006	<LOD	<LOD	95	R	73	<LOD	22195	<LOD			
5-3A	61	2/15/2006	<LOD	<LOD	38	<LOD	80	<LOD	15296	<LOD			
5-3B	61	2/15/2006	<LOD	<LOD	67	R	271	302	12998	<LOD			
5-3C	61	2/15/2006	<LOD	<LOD	44	R	89	<LOD	16090	<LOD			
5-3D	61	2/15/2006	<LOD	<LOD	85	R	88	<LOD	21389	<LOD			
5-3E	60	2/15/2006	<LOD	<LOD	83	R	<LOD	<LOD	23488	<LOD			
5-4A	62	2/15/2006	<LOD	<LOD	42	<LOD	<LOD	<LOD	12998	<LOD			

5-4B	61	2/15/2006	<LOD	<LOD	39	R	174	<LOD	9747	<LOD			
5-4C	61	2/15/2006	<LOD	<LOD	155	R	642	831	19891	<LOD			
5-4D	61	2/15/2006	<LOD	<LOD	35	R	153	<LOD	9325	<LOD			
5-4E	61	2/15/2006	<LOD	<LOD	80	R	110	<LOD	20096	<LOD			
5-5A	61	2/15/2006	<LOD	<LOD	61	R	313	451	18189	<LOD			
5-5B	61	2/15/2006	<LOD	<LOD	41	R	142	<LOD	16691	<LOD			
5-5C	61	2/15/2006	<LOD	<LOD	40	R	112	<LOD	10099	<LOD			
5-5D	61	2/15/2006	<LOD	<LOD	70	R	185	<LOD	16589	<LOD			
5-5E	61	2/15/2006	<LOD	<LOD	57	R	<LOD	<LOD	18099	<LOD			
Mean					65		163		16875				
5-BK-1	78	2/15/2006	<LOD	<LOD	50	<LOD	<LOD	<LOD	14797	<LOD			
5-BK-2	63	2/15/2006	<LOD	<LOD	80	<LOD	<LOD	<LOD	18189	<LOD			
Area 6													
6-OP-1	61	2/15/2006	<LOD	<LOD	176	R	2610	3418	20493	<LOD			
6-OP-2	60	2/15/2006	<LOD	<LOD	125	R	587	590	16589	<LOD			
6-OP-3	61	2/15/2006	<LOD	<LOD	187	R	1540	1850	17792	<LOD			
6-OP-4	65	2/15/2006	<LOD	<LOD	47	R	144	<LOD	11200	<LOD			
6-5A	62	2/15/2006	<LOD	<LOD	70	R	168	<LOD	16896	<LOD			
6-5B	65	2/15/2006	<LOD	<LOD	82	R	197	<LOD	16589	<LOD			
6-5C	63	2/15/2006	<LOD	<LOD	<LOD	R	157	<LOD	23795	<LOD			
6-5B	84	2/15/2006	<LOD	<LOD	89	R	207	<LOD	16691	<LOD			
6-1A	61	2/15/2006	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	17894	<LOD			
6-1B	61	2/15/2006	<LOD	<LOD	55	R	<LOD	<LOD	21299	<LOD			
6-1C	61	2/15/2006	<LOD	<LOD	126	<LOD	174	<LOD	21594	<LOD			
6-2A	63	2/15/2006	<LOD	<LOD	378	R	<LOD	<LOD	25498	<LOD			
BLK	63	2/15/2006	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	141	<LOD			
2710	68	2/15/2006	5619	<LOD	708	<LOD	6957	3010	32691	12397			
2711	91	2/15/2006	1100	<LOD	62	<LOD	274	<LOD	20390	<LOD			
6-2B	62	2/15/2006	<LOD	<LOD	50	R	95	<LOD	18688	<LOD			
6-2C	61	2/15/2006	32	<LOD	102	R	172	<LOD	16998	<LOD			
6-3A	61	2/15/2006	<LOD	<LOD	237	R	146	<LOD	23488	<LOD			
6-3B	61	2/15/2006	<LOD	<LOD	95	R	636	680	17190	<LOD			
6-3C	61	2/15/2006	<LOD	<LOD	59	R	163	<LOD	13389	<LOD			
6-4A	63	2/15/2006	<LOD	<LOD	72	R	73	<LOD	13990	<LOD			
6-4B	62	2/15/2006	<LOD	<LOD	<LOD	1010	1390	1400	26496	<LOD			
6-4C	61	2/15/2006	<LOD	<LOD	97	R	121	<LOD	19597	<LOD			

Mean					148		832		18669				
6-BK-2	62	2/15/2006	<LOD	<LOD	90	<LOD	<LOD	<LOD	20595	<LOD			
6-BK-1	60	2/15/2006	<LOD	<LOD	166	R	<LOD	<LOD	28083	<LOD			
2711	62	2/15/2006	1110	<LOD	92	<LOD	287	<LOD	20493	<LOD			
BLK	61	2/15/2006	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD			
2710	98	2/16/2006	5587	36	785	<LOD	6957	3200	32998	10400			
Geoprobe Samples													
1-1BB-1	61	2/14/2006	<LOD	<LOD	240	<LOD	83	<LOD	26394	<LOD			
1-1BB-3	65	2/14/2006	<LOD	<LOD	143	<LOD	<LOD	<LOD	9216	<LOD			
1-2B-2	61	2/14/2006	94	<LOD	1570	<LOD	234	<LOD	13888	<LOD			
1-2B-4	60	2/14/2006	27	<LOD	895	<LOD	88	<LOD	14899	<LOD			
1-2B-6	64	2/14/2006	32	<LOD	1290	<LOD	123	<LOD	9939	<LOD			
1-2B-8	61	2/14/2006	<LOD	<LOD	3888	<LOD	99	<LOD	18394	<LOD			
1-2B-10	63	2/14/2006	<LOD	<LOD	366	<LOD	<LOD	<LOD	6250	<LOD			
1-2B-12	61	2/14/2006	<LOD	<LOD	8134	<LOD	104	<LOD	51098	<LOD			
1-2B-15	65	2/15/2006	<LOD	<LOD	23	<LOD	73	<LOD	21491	<LOD			
1-3B-2	59	2/15/2006	63	<LOD	1470	<LOD	298	<LOD	16998	<LOD			
1-3B-4	64	2/15/2006	<LOD	<LOD	1180	<LOD	<LOD	<LOD	8614	<LOD			
1-3B-6	61	2/15/2006	<LOD	<LOD	2099	<LOD	<LOD	<LOD	27187	<LOD			
1-3B-8	62	2/15/2006	<LOD	<LOD	38	<LOD	72	<LOD	17792	<LOD			
1-3B-10	72	2/15/2006	<LOD	<LOD	42	R	93	<LOD	16090	<LOD			
1-3B-12	65	2/15/2006	<LOD	<LOD	40	<LOD	<LOD	<LOD	14093	<LOD			
4-1B	66	2/15/2006	<LOD	<LOD	2059	<LOD	<LOD	<LOD	17600	<LOD			
4-1B-2	64	2/15/2006	<LOD	<LOD	139	<LOD	66	<LOD	16192	<LOD			
4-1B-4	62	2/15/2006	<LOD	<LOD	82	R	<LOD	<LOD	14989	<LOD			
4-1B-6	63	2/15/2006	<LOD	<LOD	81	<LOD	<LOD	<LOD	14797	<LOD			
4-1C-2	68	2/15/2006	<LOD	<LOD	814	<LOD	<LOD	<LOD	13299	<LOD			
4-1C-4	62	2/15/2006	<LOD	<LOD	32	<LOD	<LOD	<LOD	11200	<LOD			
4-1C-6	66	2/15/2006	<LOD	<LOD	204	<LOD	<LOD	<LOD	9907	<LOD			
5-2C	61	2/15/2006	<LOD	<LOD	76	R	220	172	12294	<LOD			
5-2C-2	60	2/15/2006	<LOD	<LOD	54	R	72	<LOD	8749	<LOD			
5-2C-4	61	2/15/2006	<LOD	<LOD	53	R	96	<LOD	11200	<LOD			
5-2C-6	62	2/15/2006	<LOD	<LOD	68	R	172	<LOD	17894	<LOD			
5-2C-8	60	2/15/2006	<LOD	<LOD	59	<LOD	<LOD	<LOD	19699	<LOD			
6-1B-0	64	2/15/2006	<LOD	<LOD	77	R	609	702	15091	<LOD			
6-1B-2	61	2/15/2006	<LOD	<LOD	137	R	2389	2810	24294	<LOD			

6-1B-4	61	2/15/2006	<LOD	<LOD	67	R	1020	1300	22093	<LOD			
6-1B-6	62	2/15/2006	<LOD	<LOD	56	R	151	131	18189	<LOD			
6-1B-8	61	2/15/2006	<LOD	<LOD	<LOD	<LOD	72	<LOD	14797	<LOD			
6-2B	61	2/15/2006	<LOD	<LOD	132	R	2259	2930	22797	<LOD			
6-2B-2	60	2/15/2006	<LOD	<LOD	178	R	1630	2069	26189	<LOD			
6-2B-4	62	2/15/2006	<LOD	<LOD	30	<LOD	<LOD	<LOD	22298	<LOD			
Mean					759								
BLK	32	2/15/2006	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD			
2710	61	2/15/2006	5290	43	655	<LOD	6387	3029	31693	11699			
2711	61	2/15/2006	1070	<LOD	120	<LOD	320	<LOD	19699	<LOD			
Area Composites													
1-COMP	64.5	2/16/2006	39	<LOD	1709	R	143	<LOD	15488	<LOD			
2-COMP	60.7	2/16/2006	<LOD	<LOD	975	<LOD	49	<LOD	21594	<LOD			
4-COMP	61	2/17/2006	<LOD	<LOD	1240	<LOD	<LOD	<LOD	8378	<LOD			
5-COMP	131	2/16/2006	<LOD	13	96	R	101	124	17498	<LOD			
6-COMP	60.2	2/16/2006	<LOD	<LOD	156	R	234	270	21094	<LOD			
Area 2 Waste Rock													
2-A4 75N 0-6	66.1	2/16/2006	<LOD	<LOD	1819	R	<LOD	<LOD	30797	<LOD			
2-A5 75N/150E 0-6	60.5	2/16/2006	<LOD	<LOD	4618	R	<LOD	<LOD	21491	<LOD			
2-2B 22N	60.9	2/16/2006	<LOD	<LOD	619	R	<LOD	<LOD	16589	<LOD			
2-2B 100N/75W 0-6	60.5	2/16/2006	<LOD	<LOD	1370	R	<LOD	<LOD	46285	<LOD			
2-2B 40S/50W 0-6	62.5	2/16/2006	<LOD	<LOD	1749	R	<LOD	<LOD	36275	<LOD			
2-2B 40S/50W 0-6	62.8	2/16/2006	<LOD	<LOD	2680	R	<LOD	<LOD	30592	<LOD			
2-2B 125N/0-5	61.5	2/16/2006	<LOD	<LOD	2099	R	<LOD	<LOD	26496	<LOD			
2-2B 100N/70W 0-6	61.9	2/16/2006	<LOD	<LOD	1120	R	<LOD	<LOD	29696	<LOD			
2-B3 S12 0-6	60.8	2/16/2006	<LOD	<LOD	710	R	<LOD	<LOD	25997	<LOD			
2-3B 110W/25S 0-10	60.7	2/16/2006	<LOD	<LOD	1779	R	<LOD	<LOD	36096	<LOD			
2-3B 75W/40S 0-6	60	2/16/2006	<LOD	<LOD	1909	R	79	<LOD	30080	<LOD			
2-5C 75W/15S 0-6	62.3	2/16/2006	<LOD	<LOD	1880	R	<LOD	<LOD	38784	<LOD			
2-3B 65E/25S 0-5	68.5	2/16/2006	<LOD	<LOD	998	R	65	<LOD	26778	<LOD			
2-3B 150N/110E 0-8	61	2/17/2006	<LOD	<LOD	586	R	<LOD	<LOD	31283	<LOD			
2-3B 125W/135W 0-6	60.5	2/17/2006	<LOD	<LOD	1490	R	<LOD	<LOD	25997	<LOD			
2-4B 40N/150W 0-6	60.8	2/17/2006	<LOD	<LOD	6038	R	<LOD	<LOD	42880	<LOD			
2 5B 50S/40W 0-8	60.8	2/17/2006	<LOD	<LOD	3779	R	<LOD	<LOD	26598	<LOD			
2-6B 75S/35W	61.9	2/17/2006	<LOD	<LOD	272	<LOD	84	<LOD	16589	<LOD			

2-3C 70E 0-6	67.1	2/17/2006	<LOD	<LOD	894	R	<LOD	<LOD	26982	<LOD			
2-5C 35S/15E 0-6	61.8	2/17/2006	<LOD	<LOD	3069	R	<LOD	<LOD	32998	<LOD			
2-5C 75N/85W 0-6	77.4	2/17/2006	<LOD	33	4848	R	<LOD	<LOD	25395	<LOD			
2-5C 25N/30E 0-5	60.7	2/17/2006	<LOD	<LOD	931	R	<LOD	<LOD	24691	<LOD			
2-1D 75S/50E 0-6	71	2/17/2006	<LOD	<LOD	1270	R	<LOD	<LOD	22989	<LOD			
2-1D 75S/50W 0-6	60.4	2/17/2006	<LOD	<LOD	1110	R	<LOD	<LOD	34688	<LOD			
2-1D 450S/50W 0-6	68.4	2/17/2006	<LOD	<LOD	2760	R	<LOD	<LOD	35482	<LOD			
1-2D 350S/50W E	60.8	2/17/2006	<LOD	<LOD	350	R	<LOD	<LOD	29978	<LOD			
2-3D 25W/75W 0-8	61.5	2/17/2006	<LOD	<LOD	1060	R	45	<LOD	22195	<LOD			
2-3D 0-6	63.7	2/17/2006	<LOD	<LOD	620	R	<LOD	<LOD	26598	<LOD			
2-3D 90N/45E 0-6	60.3	2/17/2006	90	<LOD	3040	R	<LOD	<LOD	24691	<LOD			
1-2D 50W/175E	61.2	2/17/2006	<LOD	<LOD	568	R	<LOD	<LOD	41984	<LOD			
2-5D 25N/50W 0-6	61.1	2/17/2006	<LOD	<LOD	2339	R	<LOD	<LOD	37197	<LOD			
2-5E 125W/40N 0-10	61	2/17/2006	<LOD	<LOD	3638	R	<LOD	<LOD	47386	<LOD			
2-4E 75N/125W 0-6	61.1	2/17/2006	<LOD	<LOD	1709	R	<LOD	<LOD	33997	<LOD			
2-5E 25N/25E 0-6	61.4	2/17/2006	<LOD	<LOD	1810	R	65	<LOD	43392	<LOD			
2-5E 40N/75W 0-6	65.8	2/17/2006	<LOD	<LOD	5818	R	<LOD	<LOD	30285	<LOD			
Mean					2038								
Area 7													
CM-NE1	61.5	2/17/2006	<LOD	15	848	R	<LOD	<LOD	15590	<LOD			
CM-SW	62.1	2/17/2006	<LOD	<LOD	6778	R	<LOD	<LOD	57958	<LOD			
CM-SE1	61	2/17/2006	<LOD	<LOD	1970	R	<LOD	<LOD	29184	<LOD			
CM-W	60.9	2/17/2006	<LOD	<LOD	3000	R	<LOD	<LOD	31693	<LOD			
CM-NW	96.4	2/17/2006	<LOD	31	7718	R	<LOD	<LOD	27085	<LOD			
CM-S	61.3	2/17/2006	<LOD	<LOD	5120	R	<LOD	<LOD	32998	<LOD			
BD-E1	62.2	2/17/2006	<LOD	<LOD	2869	R	<LOD	<LOD	26291	<LOD			
BD-S1	60.8	2/17/2006	<LOD	<LOD	<LOD	R	<LOD	<LOD	8819	<LOD			
BD-SE1	60.6	2/17/2006	<LOD	<LOD	34	<LOD	<LOD	<LOD	19789	<LOD			
395 WR	61.9	2/19/2006	<LOD	<LOD	814	<LOD	<LOD	<LOD	41088	<LOD			
395 WR	62.1	2/19/2006	<LOD	<LOD	523	<LOD	<LOD	<LOD	24896	<LOD			
395 WR	61.1	2/19/2006	<LOD	<LOD	522	<LOD	<LOD	<LOD	19699	<LOD			
Mean					2745								
BLK	61	2/17/2006	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD	<LOD			
2710	111	2/17/2006	5728	<LOD	763	<LOD	7309	3130	34381	9907			
2710	112	2/16/2006	5530	<LOD	839	R	7149	2939	35686	9939			
2711	72.2	2/16/2006	1080	<LOD	98	R	272	84	22400	<LOD			

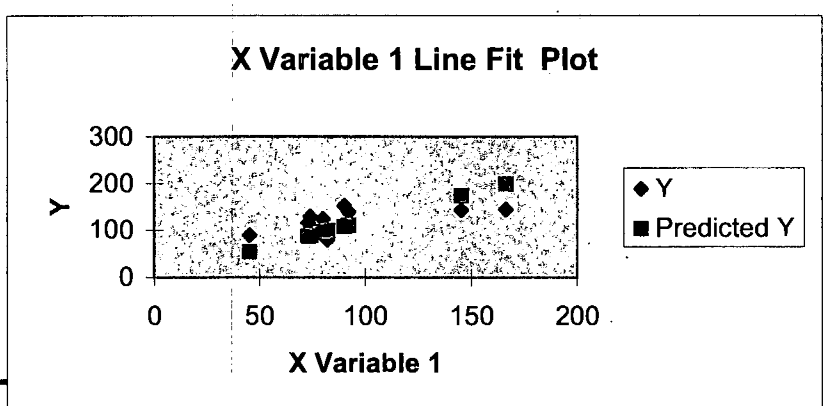
Johannsburg													
MG-C1	123	2/17/2006	34	<LOD	3360	<LOD	155	<LOD	19200	<LOD			
MG-C2	66	2/17/2006	33	<LOD	3010	<LOD	79	<LOD	20390	<LOD			
MG-NW1	61	2/17/2006	<LOD	<LOD	3040	<LOD	96	<LOD	13389	<LOD			
NW of Randsburg													
FIDDLERS	61	2/19/2006	24	<LOD	5219	<LOD	63	<LOD	16998	<LOD			
FIDDLERS	61	2/19/2006	<LOD	<LOD	6688	<LOD	82	<LOD	20198	<LOD			
FIDDLERS	61	2/19/2006	<LOD	<LOD	7725	<LOD	<LOD	<LOD	19392	<LOD			
FIDDLERS	61.1	2/26/2006	<LOD	<LOD	5718	R	<LOD	<LOD	22899	<LOD			
FIDDLERS	60.9	2/26/2006	<LOD	<LOD	5498	<LOD	63	<LOD	14195	<LOD			
Mean					6170								
[1] - Schacklette and Boerngen, 1984													
R - Indicates data rejected due to quality assurance reasons													

Table 5. Arsenic Interlaboratory Quality Assurance

Sample	XRF	CHEMEX LAB	ACZ LAB
5-4C	155	146	
2-B2	442	717	
4-2J	1070	980	
6-OP1	176	188	
5-1C	129	205	
2-D3	203	336	
6-1C	126	217	
4-2G	4950	4220	
6-1B	55	71	
1-3D	685	1090	
1-4D	781	1340	
CM-MW	7720	7910	
Comp-1	1709	1525	1490
Comp-2	975	846	993
Comp-4	1240	1870	1960
Comp-5	96	96	118
Comp-6	156	148	141
1-BK-1	92	139	
2-BK-1	73	115	
2-BK-2	45	89	
2-BK-3	74	129	
4-BK-1	82	80	
4-BK-2	145	143	
5-BK-1	80	124	
5-BK-2	90	152	
6-BK-2	166	144	
6-BK-1	90	250	

SUMMARY OUTPUT
BACKGROUND

Regression Statistics	
Multiple R	0.959086
R Square	0.919846
Adjusted R	0.794846
Standard E	37.87456
Observatio	9



ANOVA

	df	*SS*			
Regressior	1	131697.1	131697.1	91.80815	2.83E-05
Residual	8	11475.86	1434.482		
Total	9	143173			

	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*.ower 95.0%*	*Jpper 95.0%*
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A

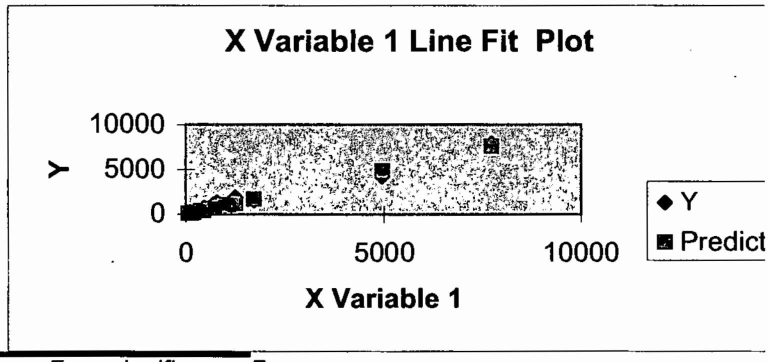
X Variable	1.202351	0.125485	9.581657	1.17E-05	0.912983	1.49172	0.912983	1.49172

RESIDUAL OUTPUT

ObservatiorPredicted Y		Residuals
1	110.6163	28.38368
2	87.77164	27.22836
3	54.10581	34.89419
4	88.974	40.026
5	98.59281	-18.59281
6	174.3409	-31.34094
7	96.1881	27.8119
8	108.2116	43.78838
9	199.5903	-55.59031

WASTE SAMPLES
SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.991247
R Square	0.982571
Adjusted R	0.920071
Standard E	315.9974
Observatio	17



ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regressior	1	90070092	90070092	902.0149	8.18E-15
Residual	16	1597669	99854.33		
Total	17	91667761			

	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Jpper 95.0%*
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable	0.988948	0.032928	30.03356	1.69E-15	0.919143	1.058752	0.919143	1.058752

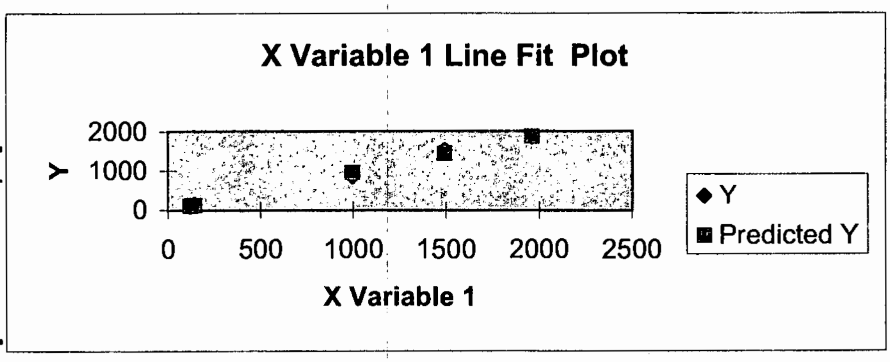
RESIDUAL OUTPUT

ObservatiorPredicted Y		Residuals
1	153.2869	-7.28689
2	437.1149	279.8851
3	1058.174	-78.17401
4	174.0548	13.94521
5	127.5743	77.42575
6	200.7564	135.2436
7	124.6074	92.39259
8	4895.291	-675.291
9	54.39212	16.60788

10	677.4292	412.5708
11	772.3681	567.6319
12	7634.676	275.3239
13	1690.112	-165.1116
14	964.224	-118.224
15	1226.295	643.7049
16	94.93898	1.061023
17	154.2758	-6.275837

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.998398
R Square	0.996798
Adjusted R	0.746798
Standard E	72.51316
Observatio	5



ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regressior	1	6548328	6548328	1245.366	5E-05
Residual	4	21032.63	5258.158		
Total	5	6569361			

	Coefficients	*tandard Err*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Jpper 95.0%*
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable	0.961614	0.027249	35.28974	3.85E-06	0.885959	1.03727	0.885959	1.03727

RESIDUAL OUTPUT

Observatior	*Predicted Y*	*Residuals*
1	1432.805	92.19461
2	954.8831	-108.8831
3	1884.764	-14.76414
4	113.4705	-17.47049
5	135.5876	12.41238

Table 5. Chemex Analytical Results, Kelly Mine, mg/kg

SAMPLE	Ag	Al	As	B	Ba	Be	Bi	Ca
	ppm	%	ppm	ppm	ppm	ppm	ppm	%
Waste Samples:								
1-3D	22.3	1.37	1090	<10	150	0.62	0.36	1.13
1-4D	17.15	0.7	1340	<10	70	0.38	0.35	0.8
2-B2	48.9	0.56	717	<10	90	0.13	0.06	0.07
2-D3	10.7	1.52	336	10	190	0.71	0.22	1.12
4-2J	68.7	0.47	980	10	50	0.12	0.08	0.46
4-2G	>100	0.87	4220	10	80	0.24	0.08	0.38
5-1C	0.18	2.05	270	10	170	0.74	0.23	3.49
5-4C	0.28	1.1	145.5	<10	170	0.6	0.4	2.48
6-1C	0.09	1.93	217	<10	130	0.63	0.17	2.33
6-B1	0.11	1.88	71.3	<10	120	0.76	0.19	2.24
6-OP-1	0.44	0.69	188.5	<10	580	0.55	0.06	4.13
CM-NW-1	>100	1	7910	<10	120	0.33	0.19	0.9
1 - Comp	25.75	0.69	1525	<10	80	0.57	0.75	1.27
2 - Comp	26.9	0.9	846	10	90	0.58	0.26	1.05
4 - Comp	52	0.3	1870	<10	50	0.15	0.08	0.52
5 - Comp	0.17	1.01	96.4	<10	100	0.61	0.12	1.63
6 - Comp	0.12	1.31	147.5	<10	140	0.66	0.12	3.07
TTLC	500		500		10000	75		
EPA PRG-	390		0.39		5400	150		
Cal PRG-R								
Background Samples:								
1-BK-1	2.82	1.52	139	10	130	0.68	0.24	0.31
2-BK-1	2.46	2.86	115	10	160	1.24	0.36	0.44
2-BK-2	0.84	2.92	88.7	20	170	1.24	0.16	1.02
2-BK-3	5.55	1.66	129	10	220	0.9	0.26	0.81
4-BK-1	1.27	1.95	79.6	10	150	0.76	0.15	0.73
4-BK-2	2.19	1.55	143	10	150	0.7	0.19	0.35
5-BK-1	0.14	1.58	123.5	<10	140	0.7	0.13	0.74
5-BK-2	0.48	1.49	152	<10	160	0.63	0.17	0.38
6-BK-1	0.14	2.02	250	10	170	0.89	0.11	5.28
6-BK-2	0.25	2.33	143.5	10	180	0.95	0.24	0.51
Mean			136.33					

Cd ppm	Ce ppm	Co ppm	Cr ppm	Cs ppm	Cu ppm	Fe %	Ga ppm	Ge ppm
0.21	38.3	8.9	59	3.73	26.5	2.44	4.76	0.08
0.11	22.5	8.1	45	3.07	25.5	1.64	2.55	0.06
0.01	16	1.1	61	4.65	7.4	1.48	2.45	0.05
0.22	48.9	8.8	34	4.15	22.9	2.68	5.61	0.1
0.01	18.35	0.8	43	2.96	7.6	0.88	1.58	0.05
0.07	17.35	4.3	106	3.9	18.4	1.88	2.5	0.06
0.14	45.2	15.9	94	5	30	3.45	6.19	0.1
0.06	30.5	7.2	58	2.47	52.6	2.56	3.38	0.16
0.21	48.4	11.4	71	9.19	26.4	2.81	7.82	0.09
0.1	49.8	14	66	10.95	27.1	3.18	6.89	0.11
0.08	32.4	7.1	19	2.08	19.1	2.78	2.31	0.17
0.07	9	5.8	73	3.98	32.4	3.67	2.74	0.07
0.19	22.8	7.4	11	5.26	36.6	2.16	2.52	0.06
0.18	31.1	7.5	15	4.83	28.2	3.03	3.61	0.08
0.03	14.05	2.2	7	3.85	10.5	1.43	1.18	<0.05
0.09	37	8.2	21	3.32	16.3	2.24	3.84	0.09
0.11	35.2	9.2	27	5.14	16.3	2.72	4.37	0.09
100		8000	2500		2500	2.3		
37		900	210		3100			
0.12	44.6	9.4	56	3.53	21.4	2.44	5.23	0.1
0.16	49.6	13.1	59	5.63	31.2	3.53	9.18	0.12
0.07	64.3	8.3	35	5.5	17.4	4.68	9.82	0.13
0.27	61.1	6.9	34	3.87	18	2.51	6.57	0.12
0.11	40.3	6.3	45	3.33	16.2	2.05	6.08	0.12
0.1	47.3	7.2	59	3.06	15	2.3	5.54	0.12
0.13	52.2	9.8	39	3.84	17.2	2.8	6.01	0.11
0.15	45.4	9	81	3.14	21.2	2.5	4.77	0.09
0.11	52.5	12	34	4.35	19.4	3.58	6.45	0.12
0.08	56.4	11.3	57	4.6	23.2	3.11	7.24	0.09
						2.95		

Hf ppm	Hg ppm	In ppm	K %	La ppm	Li ppm	Mg %	Mn ppm	Mo ppm
0.03	0.57	0.028	0.45	19.7	16.8	0.48	419	2.7
0.02	0.4	0.022	0.24	11.1	9.9	0.3	340	0.75
<0.02	2.25	0.016	0.35	8	1.6	0.04	23	2.76
0.05	0.17	0.028	0.46	24.3	19.4	0.56	505	1.2
<0.02	1.87	0.01	0.28	9.3	1.4	0.03	20	0.76
<0.02	0.48	0.028	0.38	8.4	4.7	0.11	132	1.32
0.06	0.18	0.034	0.6	23.4	22.4	1	584	2.21
0.03	3.03	<0.005	0.33	13.3	13.7	0.54	330	1.99
0.03	0.42	0.036	0.54	24	24.8	0.72	489	2.17
0.03	0.65	0.036	0.47	24.2	29.7	0.85	482	1.15
0.02	7.6	<0.005	0.26	17	9.5	0.42	536	4.82
<0.02	1.78	0.048	0.66	4.5	3	0.15	148	2.84
0.03	1.84	0.044	0.2	11.4	8.8	0.33	319	1.16
0.04	2.77	0.029	0.34	15.2	11.4	0.38	331	0.75
0.03	2.2	0.017	0.15	7.1	2.1	0.08	73	0.37
0.04	1.94	0.02	0.29	17.1	13.1	0.55	417	0.73
0.03	1.86	0.024	0.32	17	15	0.66	491	0.95
	20							3500
							1800	
0.11	0.1	0.027	0.41	21.8	18.8	0.42	472	2.26
0.2	0.09	0.042	0.61	26.6	31.6	0.67	578	1.85
0.09	0.08	0.04	0.6	34.4	27.1	0.7	342	0.7
0.06	0.14	0.029	0.49	30.6	25.2	0.55	507	0.9
0.08	0.1	0.023	0.44	22.2	20.8	0.55	345	0.71
0.17	0.09	0.022	0.39	23.8	17.9	0.44	421	2.13
0.07	0.09	0.026	0.4	23.7	21.5	0.61	508	0.68
0.06	0.08	0.025	0.45	23	15.8	0.48	486	2.57
0.07	0.19	0.036	0.48	25.5	17.6	0.63	688	1.78
0.1	0.07	0.033	0.44	25.5	21.1	0.58	440	0.74

Na %	Nb ppm	Ni ppm	P ppm	Pb ppm	Rb ppm	Re ppm	S %	Sb ppm
0.03	0.5	21	630	29.4	24.8	<0.001	0.46	86.6
0.02	0.17	24.4	440	25.5	15.1	<0.001	0.33	119.5
0.02	<0.05	4.2	170	6.7	22.9	<0.001	0.57	858
0.03	0.65	16.6	770	31.8	27.8	<0.001	0.14	37.3
0.03	<0.05	2.6	170	8.6	18.9	<0.001	0.64	118
0.13	<0.05	16.2	490	11.9	23.5	<0.001	1.18	198.5
0.03	0.61	84.7	660	12.6	32.1	<0.001	0.02	18.6
0.74	0.09	6.7	390	16.7	11.5	<0.001	0.18	10.1
0.04	0.75	34	580	15.3	34.6	0.001	0.02	27.8
0.03	0.21	44.7	570	21.7	32.9	0.002	0.02	27.8
0.46	<0.05	5.8	1260	18	8.9	<0.001	0.19	7.95
0.02	<0.05	15.9	510	18.9	39.2	<0.001	2.49	226
0.03	0.21	19.6	660	53.4	14.3	<0.001	0.67	128.5
0.03	0.4	19.7	670	43.8	21.9	<0.001	0.99	131.5
0.05	0.14	6.9	440	9.1	10.1	<0.001	0.65	142.5
0.03	0.41	24.7	630	11.3	17.5	0.002	0.02	11.95
0.02	0.26	29.4	750	17.6	17.8	0.005	0.07	20.8
		2000		1000				500
		1600		400				31
				150				
0.03	0.57	22.4	560	13.8	28.7	<0.001	0.05	12.6
0.03	0.3	30.5	680	19.3	49.4	<0.001	0.05	11.1
0.02	0.32	13.7	520	13	39.5	<0.001	0.03	4.22
0.04	0.92	12.5	1940	48.9	31	<0.001	0.03	9.79
0.03	0.86	16.6	690	10.9	29.8	<0.001	0.04	5.31
0.04	0.84	16	460	34.1	29	<0.001	0.03	6.5
0.02	0.51	20	870	10.7	24.1	<0.001	0.01	12.05
0.03	0.84	34.7	670	11.4	25.4	<0.001	0.02	9.27
0.02	0.41	16.1	820	10.6	26.4	<0.001	0.02	9.01
0.02	0.22	34.2	320	15.5	26.6	<0.001	0.01	3.57
								8.342

Sc ppm	Se ppm	Sn ppm	Sr ppm	Ta ppm	Te ppm	Th ppm	Ti %	Tl ppm
3.4	1	1.4	70.3	<0.01	0.08	5.9	0.023	0.44
2.8	1	1.3	51.3	<0.01	0.08	3.5	0.01	0.36
2	2.2	0.7	40.6	<0.01	0.02	2.1	<0.005	1.62
3.9	0.7	5.8	75.1	<0.01	0.03	7.4	0.034	0.3
1.6	1.3	0.5	18.8	<0.01	0.02	2.2	<0.005	0.71
2.2	2.9	0.8	31.1	<0.01	0.02	2.1	<0.005	1.34
6.3	0.5	0.8	90.6	<0.01	0.03	8.7	0.038	0.24
3.2	4.6	1.7	172	<0.01	0.14	2.7	0.011	0.03
5.5	0.5	1.4	63.5	<0.01	0.02	7.4	0.031	0.25
6.1	0.6	0.9	68.9	<0.01	0.03	8.6	0.024	0.38
4.1	4.5	1.8	268	<0.01	0.09	2.9	0.005	0.02
3.3	4.7	0.3	18.1	<0.01	0.03	1.3	<0.005	0.94
2.8	1.1	0.8	94.3	<0.01	0.52	4.4	0.01	0.65
3.6	1.4	6.8	69.3	<0.01	0.03	7	0.02	0.88
2.2	0.9	0.4	28.2	<0.01	0.02	2.8	0.006	0.82
3.7	0.9	0.5	69.6	<0.01	0.01	5.2	0.025	0.19
4.1	0.3	0.5	98.4	<0.01	0.01	5.5	0.024	0.32
	100							700
	390	47000						5.2
4.4	0.4	0.9	36.6	<0.01	0.03	7.4	0.059	0.24
7.3	0.6	2	51.9	<0.01	0.03	10.3	0.081	0.37
5.7	0.6	1.3	81.3	<0.01	0.02	9.9	0.029	0.29
3.4	0.5	2.2	61.7	<0.01	0.02	8.9	0.043	0.2
3.9	0.4	0.9	36.2	<0.01	0.02	7.6	0.058	0.17
3.6	0.4	1	62.1	<0.01	0.03	9.2	0.074	0.17
4.1	0.3	0.6	37.2	<0.01	0.03	7.5	0.04	0.19
4.1	0.4	0.9	29.7	<0.01	0.02	7.7	0.042	0.2
5.1	0.6	0.5	97.1	<0.01	0.02	8.4	0.036	0.28
5.6	0.4	0.8	34.3	<0.01	0.02	10.3	0.026	0.19

U ppm	V ppm	W ppm	Y ppm	Zn ppm	Zr ppm	Ag ppm
1.14	28	15.45	8.09	97	1	
0.97	17	14.35	5.73	97	0.5	
0.26	19	3.34	1.36	5	<0.5	
1.08	32	11	10.1	96	1.7	
0.33	9	1.94	1.56	4	<0.5	
0.26	15	2.51	2.83	18	<0.5	110
1.27	46	67.6	10.8	80	1.7	
0.82	26	2420	6.19	73	1	
1.07	47	240	9.49	180	<0.5	
1.21	49	320	9.74	84	0.5	
1.56	20	700	9.47	85	<0.5	
0.25	21	1.94	2.77	30	<0.5	209
1.13	18	12.1	6.9	144	0.7	
0.82	25	3.99	7.46	87	1	
0.58	10	0.93	2.23	42	0.7	
0.65	29	350	8.27	59	1	
0.84	33	840	9.56	88	0.6	
	2400			5000		
16	550			23000		
1.02	43	3.84	9.86	57	3.2	
1.4	60	2.33	13	88	5.9	
1.01	45	1.12	13.3	87	2.6	
1.14	32	3.9	10.65	110	1.9	
0.9	33	9.09	9.47	54	3.1	
1.27	44	4.98	9.45	52	5.2	
0.78	40	22.8	9.49	73	2.1	
0.94	35	18.7	8.91	59	1.9	
1.04	45	23.4	11.75	93	2.4	
0.98	39	2.94	10.45	70	3.1	
		9.31				

Table 6. ACZ Analytical Results, Kelly Mine, mg/kg

	1-COMP	2-COMP	4-COMP	5-COMP	6-COMP	2-OP-3	DIWET	TTLC	EPA PRGs	RMC -R	RMC-W
Aluminum	8410	9760	4610	11600	12700	6420					
Antimony	44	62	67	5.3	9.3	64			31	3	NA
Arsenic (WET)	0.48	0.11	0.5	0.06	<0.4	5.23	5.0				
Arsenic	1490	993	1960	118	144	2280		500	0.39	1	275
Barium (WET)	0.036	0.009	<0.003	0.045	0.03	0.009	100.0				
Barium	110	106	57.7	139	141	74.4			5400		
Beryllium	0.6	0.6	0.2	0.6	0.6	0.4			150		
Cadmium (WET)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	1.0			3	3
Cadmium	0.18	0.33	<0.05	0.1	0.11	0.58		75	37		
Calcium	18500	7880	5240	15200	25300	12700					
Chromium (WET)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	5.0				
Chromium	13	15	9	22	26	19		2500	210		
Cobalt	7	7	2	7	8	7			900		
Copper (WET)	<0.01	<0.01	<0.01	0.01	<0.01	0.02				250	136
Copper	40	20	10	14	13	125	NA	2500	3100		
Iron	20000	26400	13700	20300	23200	24100			23000		
Lead (WET)	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	5.0				
Lead	48.9	29.6	10.4	15.4	11	185		1000	150	400	125
Magnesium	3480	3660	940	5660	6080	6710					
Manganese	329	293	67.3	396	418	274			1800	960	NA
Mercury (WET)	<0.0002	<0.0002	0.016	<0.0002	<0.0002	0.0002	0.2				
Mercury	0.73	1.22	1.42	0.65	0.55	3.92		20	23	2	8
Nickel	19	17	6	22	8	25		2000	1600	135	
pH	7	6.3	7	7.8	7.5	8					
Potassium	3340	4180	3080	3880	3970	2920					
Selenium (WET)	<0.04	<0.04	<0.04	<0.04	<0.04	0.12	1.0				
Selenium	0.9	0.9	1.3	<0.5	<0.5	2.7			390	35	NA
Silver (WET)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA				
Silver	23.8	18	45.7	0.11	0.09	22.3			390	35	NA
Sodium	330	320	610	360	170	11500					
Thallium	0.75	0.93	0.98	0.23	0.28	0.81			5.2		
Vanadium	18.5	22.1	11.5	27.1	28.6	271			550		
Zinc (WET)	<0.01	<0.01	<0.01	0.05	<0.01	<0.01	NA				
Zinc	153	184	41	57	72	675		5000	23000	2000	307

Total Cyanide	NA	NA	NA	NA	NA	40	1200[a]

BLM RMC-R Indicates residential risk management criteria

BLM RMC-W Indicates wildlife risk management criteria

NA Indicates not analyzed

[a]free cyanide

Table 7. Laboratory Analytical Results, Jacobs Smelter OU2, NE Stockton, mg/kg

ANALYTE	26R11 0-4	Q	LG-A2	Q	LG-N3	Q	SE-11	Q	LG-A3	Q	SP30PT	Q	1H8 0-6	Q	1E11 6-12	Q	1B2 0-6	Q
Aluminum, total (3050)	13200		12000		15900		16100		8110		2990		12100		10000		12300	
Antimony, total (3050)	6	B	11		2	B	5	B	18		71		5	B	14		17	
Arsenic, total (3050)	536		712		24		32		1180		371		315		641		1910	
Barium, total (3050)	285		227		158		166		241		244		132		164		284	
Beryllium, total (3050)		U		U	0.4	B	0.3	B		U		U		U		U		U
Boron, total (3050)	15		16		13		16		8		3	B	13		6		10	
Cadmium, total (3050)	5.7		8.4		4.2		3.9		5.1		8.6		4.4		8		5.5	
Calcium, total (3050)	11900		9280		4530		12600		25500		31300		18900		28300		32100	
Chromium, total (3050)	19		22		27		25		19		25		20		22		24	
Cobalt, total (3050)	5	B	3		6		6		3	B	4	B	4	B	3	B	4	B
Copper, total (3050)	89		150		41		90		113		560		69		136		175	
Iron, total (3050)	17700		20600		15000		17000		26200		35300		14900		23300		28300	
Lead, total (3050)	2020		4350		594		1030		5000		9090		1700		4890		6580	
Magnesium, total (3050	7200		6130		7370		6950		4490		2180		6720		5360		6360	
Manganese, total (3050	2070		2200		781		897		3230		3660		1180		2150		3340	
Mercury, total	0.13		0.22		0.1	B	0.08	B	0.17	B	0.52			U	0.2		0.41	
Molybdenum, total (305	3	B	4		2	B	4	B	3	B	5		2	B	3	B	4	B
Nickel, total (3050)	23		16		20		20		16		23		17		16		19	
Potassium, total (3050)	4080		4100		4550		5190		2900		1180		3710		3030		3810	
Selenium, total (3050)	13	B	16		10	B	13	B	21		26		14	B	18	B	20	
Silica, total (3050)	3960		2900		2950		3210		3280		2740		3300		3220		3320	
Silver, total (3050)	8		11		4		5		15		20		7		16		18	
Sodium, total (3050)	210		240		190		190		130		140		170		160		170	
Thallium, total (3050)	13.15		18.81		6.89		11.43		15.4227		74.83		11.68		12.8		22.56	
Tin, total (3050)		U				U		U		U		U		U		U		U
Vanadium, total (3050)	22.5		20.6		31.8		28.6		13.2		35.3		21.8		18.1		19.8	
Zinc, total (3050)	361		493		218		235		547		1350		250		801		485	
Solids, Percent	97.7		97		93.9		91.2		98.3		97.5		97.4		92.8		89.4	

Q - Qualifier
B - Detected in lab blank
U - Undetected

Table 7. Laboratory Analytical Results, Jacobs Smelter OU2, NE Stockton, mg/kg

ANALYTE	11Q4 6-12	Q	I5 0-6	Q	9E3 6-12	Q	14F2 0-6	Q	5C5 0-6	Q	1B14 6-12	Q	11Q2 6-12	Q	SE-4	Q	LG-B1	Q
Aluminum, total (3050)	9250		11600		13400		16000		12600		7360		17200	B	12800		8330	
Antimony, total (3050)	30		7	B	31		6	B	7	B	12		5		70		28	
Arsenic, total (3050)	2770		366		3030		882		478		1080		345		193		3190	
Barium, total (3050)	286		158		436		218		206		138		176	B	190		500	
Beryllium, total (3050)		U		U		U	0.2	B		U		U	0.3			U		U
Boron, total (3050)	8		9		20		19		6		3	B	16		2	B	2	B
Cadmium, total (3050)	6		4.1		5.4		3.8		3.4		5.3		3.1		3.4		10.7	
Calcium, total (3050)	48400		26300		17100		6840		40100		28300		8290		46400		38900	
Chromium, total (3050)	28		27		28		26		28		15		30		23		18	
Cobalt, total (3050)	3	B	4	B	4	B	5		4	B	2	B	6		6		3	B
Copper, total (3050)	222		77		193		59		53		126		54		148		363	
Iron, total (3050)	42100		17000		42600		19500		24200		17800		20500		21200		34800	
Lead, total (3050)	10000		2370		10600		3560		5650		8550		1980		3590		8380	
Magnesium, total (3050	5050		6540		6540		7500		6360		4240		7710		6660		4930	
Manganese, total (3050	6210		1770		4550		1660		5080		2270		1310	B	1530		3960	
Mercury, total	0.65		0.18	B	0.86		0.12	B	0.1	B	0.32		0.13	B	0.1	B	0.51	
Molybdenum, total (305	5		2	B	5	B	3	B	3	B	2	B	3		4	B	5	
Nickel, total (3050)	19		21		19		21		22		14		25		20		12	
Potassium, total (3050)	2790		3530		4340		5290		3620		2370		5170	U	3850		2720	
Selenium, total (3050)	30		14	B	31		14	B	23			U			15	B	25	
Silica, total (3050)	3200		3380		3800		3280		3380		3190		3410		3100		1450	
Silver, total (3050)	27		7		24		7		11		17		8		9		25	
Sodium, total (3050)	120		160		190		180		160		120		190		150		150	
Thallium, total (3050)	29.84		10.14		29.94		13.45		17.44		11.95		15.37	U	12.1873		26.7954	
Tin, total (3050)		U		U		U		U		U		U			30	B		U
Vanadium, total (3050)	14.4		23.4		15.7		24.2		20.6		13.4		27.3		25.6		14.3	
Zinc, total (3050)	644		265		417		212		249		528		188		274		937	
Solids, Percent	92.6		95.7		93.7		93.8		97.9		94.7		96.1		93.8		98.1	

Q - Qualifier
B - Detected in lab blank
U - Undetected

Table 7. Laboratory Analytical Results, Jacobs Smelter OU2, NE Stockton, mg/kg

ANALYTE	26M1 0-4	Q	LG-K4	Q	LG-J6	Q	LG-N4	Q	LG-H7	Q	25B2 6-12	Q	25J2 12-18	Q	LG-B7	Q	LG-C3	Q
Aluminum, total (3050)	10400		17500		17100		17400		18700		7910		9680		17300		9340	
Antimony, total (3050)	24		2	B	4	B		U	3	B	39		23			U	15	
Arsenic, total (3050)	2980		20		69		25		42		2430		2800		49		1500	
Barium, total (3050)	371		154		184		165		171		370		301		233		286	
Beryllium, total (3050)		U	0.4	B	0.3	B	0.4	B	0.4	B		U		U	0.4	B		U
Boron, total (3050)	6		14		7		18		12		8		6		16		7	
Cadmium, total (3050)	6.6		3.8		3.5		5.1		3.8		15.5		6.6		3.9		5.4	
Calcium, total (3050)	26400		12700		76600		17900		4300		27200		35800		18400		22600	
Chromium, total (3050)	26		24		19		28		24		22		24		29		18	
Cobalt, total (3050)	3	B	6		5	B	6	B	8		3	B	4	B	7		3	B
Copper, total (3050)	204		46		43		47		35		265		186		52		161	
Iron, total (3050)	46900		16600		14700		15500		17500		51300		40700		16200		24800	
Lead, total (3050)	8090		388		543		627		382		12800		8090		295		6690	
Magnesium, total (3050	5890		7500		9290		9110		5780		4100		5310		9320		5480	
Manganese, total (3050	6910		633		732		795		970		7820		6430		997		2750	
Mercury, total	0.59		0.06	B	0.08	B	0.09	B	0.06	B	0.41		0.39		0.07	B	0.36	
Molybdenum, total (305	5		3	B	3	B	3	B	4	B	7		5	B	3	B	4	B
Nickel, total (3050)	15		19		17		21		20		14		16		24		12	
Potassium, total (3050)	3120		5320		5610		5420		4900		2400		2830		5540		2960	
Selenium, total (3050)	31		11	B	11	B	14	B	14	B	35		28		12	B	19	B
Silica, total (3050)	1210		1400		3410		3250		3140		1680		1430		1410		1050	
Silver, total (3050)	24		4		5		4		4		33		20		4		16	
Sodium, total (3050)	160		170		250		190		130		100		100		210		130	
Thallium, total (3050)	29.0394		9.8318		11.5248		7.8532		10.098		30.3264		25.557		11.4742		20.384	
Tin, total (3050)		U		U		U		U		U		U		U		U		U
Vanadium, total (3050)	14.7		30.7		22		36.1		35		11.9		15.8		33.2		17.9	
Zinc, total (3050)	584		171		141		284		153		1460		635		164		442	
Solids, Percent	98.1		91.9		89.6		86.5		92.6		95.7		95.5		97.4		96.4	

Q - Qualifier
B - Detected in lab blank
U - Undetected

Table 7. Laboratory Analytical Results, Jacobs Smelter OU2, NE Stockton, mg/kg

ANALYTE	25J2 5-10	Q	LG-I6	Q	LG-B2	Q	LG-A4	Q	LG-A1	Q
Aluminum, total (3050)	7390		10900		14500		13800		15500	
Antimony, total (3050)	29		19		3	B	3	B	5	B
Arsenic, total (3050)	4360		1660		230		179		463	
Barium, total (3050)	359		343		170		188		183	
Beryllium, total (3050)		U		U	0.2	B	0.2	B	0.2	B
Boron, total (3050)	13		14		15		9		14	
Cadmium, total (3050)	8.9		7.9		4		3.3		4.6	
Calcium, total (3050)	31500		32700		8850		50400		5470	
Chromium, total (3050)	23		30		21		20		26	
Cobalt, total (3050)	4	B	5	B	5	B	5	B	6	
Copper, total (3050)	314		193		54		45		79	
Iron, total (3050)	63900		46200		16300		14700		19000	
Lead, total (3050)	13500		8210		1200		728		1910	
Magnesium, total (3050	3930		6940		6800		7960		7510	
Manganese, total (3050	10100		7580		1000		883		1290	
Mercury, total	0.58		0.71		0.09	B	0.08	B	0.17	B
Molybdenum, total (305	5		6	B	4	B	3	B	4	B
Nickel, total (3050)	16		20		15		19		18	
Potassium, total (3050)	2210		3450		4480		4310		4620	
Selenium, total (3050)	41		31		14	B	15	B	15	B
Silica, total (3050)	2670		1510		1180		1430		1380	
Silver, total (3050)	34		21		5		5		7	
Sodium, total (3050)	100		140		160		180		170	
Thallium, total (3050)	40.188		27.258		11.388		10.9077		13.5857	
Tin, total (3050)		U		U		U		U		U
Vanadium, total (3050)	9.1		19		23.5		22.8		28.3	
Zinc, total (3050)	940		746		187		161		254	
Solids, Percent	98.3		91		96.3		97.1		97.5	

Q - Qualifier
B - Detected in lab blank
U - Undetected